

## SEQUENCE LISTING

&lt;110&gt; Kovacs, et al.

<120> Identification of a region of the major surface  
glycoprotein (MSG) gene of human Pneumocystis carinii

&lt;130&gt; 53232

&lt;140&gt;

&lt;141&gt;

&lt;160&gt; 26

&lt;170&gt; PatentIn Ver. 2.0

&lt;210&gt; 1

&lt;211&gt; 3042

&lt;212&gt; DNA

&lt;213&gt; Pneumocystis carinii sp. f. hominis

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (1)..(3042)

&lt;400&gt; 1

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Asn Val Glu Lys Lys Cys Gly Asp Phe Lys Thr Glu Leu Glu Glu Leu	
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Lys Lys Lys Cys Pro Leu Leu Tyr Glu Glu Cys Ile Phe Tyr Asp Glu	
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Ser Cys Gly Asn Asp Ser Leu Lys Cys Ser Glu Leu Glu Lys Lys Cys	
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caa gag aaa aat att act tac aca tta tca tat tca ggg ttt gat cct	816
Gln Glu Lys Asn Ile Thr Tyr Thr Leu Ser Tyr Ser Gly Phe Asp Pro	
260 265 270	
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Ile Glu Pro Glu Ile Thr Leu Ala Glu Glu Val Asp Leu Glu Gly Ile	
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Asp Tyr Asn Ala Asn Lys Asp Lys Asp Lys Lys Cys Glu Glu Leu Ser	
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Lys Val Lys Lys Glu Asn Lys Gly Val Phe Pro Ser Asn Glu Leu Phe	
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Leu Arg Met Lys Thr Ile Phe Leu Gln Asp Asp Leu Asn Arg Lys Arg	
515 520 525	
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Lys	Tyr	Gln	Gly	Ile	Asp	Ser	Lys	Thr	Lys	Ile	Glu	Glu	Leu	Gly	Thr	
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aga	gga	cat	ctt	gat	aag	aaa	aaa	aac	tgc	aaa	aca	aat	ctt	gat	aag	2160
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Cys Lys Asp Gln	Cys Lys Glu Ile Glu	Lys Ile Cys Leu Lys	Ile Glu	
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cca ctg aaa gta	aag cca cat gaa ata	aaa aca gta acg	gaa acc aac	2736
Pro Leu Lys Val	Lys Pro His Glu Ile	Lys Thr Val Thr	Glu Thr Asn	
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ata aca aca gtc	aca gaa aca gtc	aaa gaa gca gaa	aaa aca gta gga	2784
Ile Thr Thr Val	Thr Glu Thr Val	Lys Glu Ala Glu	Lys Thr Val Gly	
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	↓			
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Asp Gly Glu Lys	Cys Lys Ser Leu	Ser Thr Thr Asp	Thr Trp Val Thr	
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Lys Thr Ser Thr	His Thr Ser Thr	Ser Thr Thr Thr	Ser Thr Val Thr	
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tca aga ata aca	ctg acc tcg acg	agg cgg tgt aag	cct acg aag tgt	2928
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↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓				
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	995	1000	1005	
↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓				
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	1010			

&lt;210&gt; 2

&lt;211&gt; 1014

&lt;212&gt; PRT

<213> *Pneumocystis carinii* sp. f. *hominis*

&lt;400&gt; 2

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Ser	Glu	Ala	Asn	Leu	Thr	Pro	Glu	Gln	Val	His	Glu	Lys	Leu	Lys	Asp
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Phe	Cys	Asp	Ser	Lys	Lys	Arg	Asp	Lys	Lys	Cys	Lys	Glu	Leu	Lys	Lys
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85

90

95

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&lt;210&gt; 3

&lt;211&gt; 3006

&lt;212&gt; DNA

<213> *Pneumocystis carinii* sp. f. *hominis*

&lt;220&gt;



&lt;221&gt; CDS

&lt;222&gt; (1)..(3006)

&lt;400&gt; 3

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Asp Lys Cys Lys Lys Arg Leu Lys Glu Tyr Cys Glu Val Leu Lys Asn
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Val Thr Lys Glu Pro Lys Lys Leu Glu Glu Lys Leu Asp Gly Ile Cys
50 55 60

aaa gat gat aaa aca ata gaa gca aaa tgc aaa gaa tca gaa aca aag 240
Lys Asp Asp Lys Thr Ile Glu Ala Lys Cys Lys Glu Ser Glu Thr Lys
65 70 75 80

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Val Lys Ala Lys Cys Thr Ser Phe Gln Thr Glu Leu Asp Lys Ala Val
85 90 95

aaa aag gga gct tca aca tta gaa gat aat gat tgt aag aag aat gaa 336
Lys Lys Gly Ala Ser Thr Leu Glu Asp Asn Asp Cys Lys Lys Asn Glu
100 105 110

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115 120 125

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165 170 175

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180 185 190

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195 200 205

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210 215 220

tgt tta tta ttt ctt gaa gaa tgt tac ttt tat ggg tca aac tgt gaa 720

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Cys 225	Leu	Leu	Phe	Leu	Glu 230	Glu	Cys	Tyr	Phe	Tyr 235	Gly	Ser	Asn	Cys	Glu 240	
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Thr	Asp	Gln	Pro	Lys 245	Cys	Lys	Glu	Phe	Ala 250	Ser	Lys	Cys	Gln	Lys 255	Glu	
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Asn	Leu	Val	Tyr 260	Ala	Ala	Pro	Gly	Ser 265	His	Phe	Asp	Pro	Thr	Lys	Leu	
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Lys	Ile	Arg 275	Leu	Ala	Glu	Glu	Ile 280	Asp	Leu	Glu	Lys	Leu	Tyr	Val	Glu	
gca	gtg	aaa	aag	gga	att	cat	att	gga	agg	cca	tca	ata	aaa	gat	gaa	912
Ala	Val 290	Lys	Lys	Gly	Ile	His 295	Ile	Gly	Arg	Pro	Ser	Ile	Lys	Asp	Glu	
gtc	gct	tta	ttg	gca	tta	tta	agc	aag	agt	gat	gct	caa	aat	act	ttt	960
Val	Ala	Leu	Leu	Ala	Leu	Leu	Ser	Lys	Ser	Asp 315	Ala	Gln	Asn	Thr	Phe 320	
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Lys	Asp	Gln	Cys	Glu 325	Asp	Val	Ile	Lys	Lys	Lys	Cys	Gly	Asn	Phe 335	Lys	
gag	cat	att	att	tta	aaa	gat	tta	tgt	agt	aat	aag	act	atc	act	gat	1056
Glu	His	Ile	Ile	Leu	Lys	Asp	Leu	Cys 345	Ser	Asn	Lys	Thr	Ile	Thr	Asp	
aat	cca	aaa	gaa	aaa	tgc	gaa	gaa	cta	aat	aag	gag	tta	aca	acc	cgt	1104
Asn	Pro	Lys 355	Glu	Lys	Cys	Glu	Glu 360	Leu	Asn	Lys	Glu	Leu	Thr	Thr	Arg	
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Ile	Leu	Thr	Val	Ser	Lys	Arg 375	Ile	Glu	Lys	Tyr	Phe 380	Ala	Pro	Ala	Asn	
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Ala	Pro	Leu	Glu	Lys 420	Pro	Cys	Asn	Asn 425	Leu	Lys	Ala	Ala	Cys	Tyr	Lys 430	
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Lys	Gly	Leu	Glu	Ala	Val	Ala	Asn 440	Glu	Ala	Leu	Gln	Asp	Lys	Leu	Arg 445	
gga	aaa	ttg	caa	ggt	tca	aat	aga	aca	tgg	ctt	gaa	acc	ctt	caa	aaa	1392
Gly	Lys	Leu	Gln	Gly	Ser	Asn 455	Arg	Thr	Trp	Leu	Glu	Thr	Leu	Gln	Lys 460	
aac	ttg	gta	aaa	gtt	tgt	gaa	aag	acg	aaa	gga	gaa	agt	gat	gaa	tta	1440
Asn	Leu	Val	Lys	Val	Cys	Glu	Lys	Thr	Lys	Gly	Glu	Ser	Asp	Glu	Leu	

465	470	475	480	
ttt gta cta tgt atg aac cca ata aaa acg gct ctt aca gtg tca aca				1488
Phe Val Leu Cys Met Asn Pro Ile Lys Thr Ala Leu Thr Val Ser Thr	485	490	495	
gat ttg cga atg agg gca gtt gct ttg caa gag cat ttg aac gaa aaa				1536
Asp Leu Arg Met Arg Ala Val Ala Leu Gln Glu His Leu Asn Glu Lys	500	505	510	
cga gat ttt cca aca gaa aag gat tgt aaa gaa tta gag aaa aaa tgt				1584
Arg Asp Phe Pro Thr Glu Lys Asp Cys Lys Glu Leu Glu Lys Lys Cys	515	520	525	
gag gtc tta gga aaa gat tca aga gaa att aaa tgg tca tgt tat acg				1632
Glu Val Leu Gly Lys Asp Ser Arg Glu Ile Lys Trp Ser Cys Tyr Thr	530	535	540	
tta aaa cag cat tgc aat cgg ctg aag agc ata gag cac tta gaa gag				1680
Leu Lys Gln His Cys Asn Arg Leu Lys Ser Ile Glu His Leu Glu Glu	545	550	555	560
gag ttg cta aaa gaa aat aaa gga tat tta aaa gat gaa aat agc tgc				1728
Glu Leu Leu Lys Glu Asn Lys Gly Tyr Leu Lys Asp Glu Asn Ser Cys	565	570	575	
aaa gaa gaa gct aag aaa cga tgt gaa aaa tgg ttt aga aga gaa aat				1776
Lys Glu Glu Ala Lys Lys Arg Cys Glu Lys Trp Phe Arg Arg Glu Asn	580	585	590	
aat aaa ttt ttt tgc gct tgt tct gac ttg gaa ctt gtt tgc aaa aag				1824
Asn Lys Phe Phe Ser Ala Cys Ser Asp Leu Glu Leu Val Cys Lys Lys	595	600	605	
atc act aga aat gtt gaa tct aaa tgt aat ata ttg aaa gga cat atg				1872
Ile Thr Arg Asn Val Glu Ser Lys Cys Asn Ile Leu Lys Gly His Met	610	615	620	
gaa act atg aac gtt ata agt gaa ata gct aaa aaa gag gaa aaa ata				1920
Glu Thr Met Asn Val Ile Ser Glu Ile Ala Lys Lys Glu Glu Lys Ile	625	630	635	640
tgt gaa ttt tgg gct cca tat tgt aaa aag tac gag caa aat tgt gaa				1968
Cys Glu Phe Trp Ala Pro Tyr Cys Lys Lys Tyr Glu Gln Asn Cys Glu	645	650	655	
aaa ctt aaa aac gga gga aaa gat ggg caa tgc aaa aaa ctc aat aaa				2016
Lys Leu Lys Asn Gly Gly Lys Asp Gly Gln Cys Lys Lys Leu Asn Lys	660	665	670	
aag tgc aaa tca ttc ctt gaa aaa gaa gct tta gaa aat aaa gtt gta				2064
Lys Cys Lys Ser Phe Leu Glu Lys Glu Ala Leu Glu Asn Lys Val Val	675	680	685	
gaa gaa ttg aaa ggt agt tta tca aac gta gga gaa tgt aac aat aca				2112
Glu Glu Leu Lys Gly Ser Leu Ser Asn Val Gly Cys Asn Asn Thr	690	695	700	
ctt aat ata tac tgt aca caa ttg aaa aag gca gag aat ggg ttg gaa				2160
Leu Asn Ile Tyr Cys Thr Gln Leu Lys Lys Ala Glu Asn Gly Leu Glu	705	710	715	720

act ttg tgc aaa agc aaa gaa aac acc aag agt gac att aaa gtt aga	2208
Thr Leu Cys Lys Ser Lys Glu Asn Thr Lys Ser Asp Ile Lys Val Arg	
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Glu Glu Leu Cys Glu Lys Leu Ile Lys Arg Ile Lys Glu Lys Cys Ser	
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aaa ttg aag gac gag ctt gaa gaa gta aaa gag gtc tta gaa aag aaa	2304
Lys Leu Lys Asp Glu Leu Glu Glu Val Lys Glu Val Leu Glu Lys Lys	
755 760 765	
gaa gaa aag tat aaa aaa att aaa gaa gaa gca gaa aaa gcc atg gaa	2352
Glu Glu Lys Tyr Lys Lys Ile Lys Glu Glu Ala Glu Lys Ala Met Glu	
770 775 780	
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785 790 795 800	
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Asn Lys Ser Val Asn Lys Asp Ser Ser Asp Thr Pro Lys Glu Gly Lys	
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ggc aca aca gga ttt aaa ctt gta aga aga aat gca aaa gtg cat gta	2496
Gly Thr Thr Gly Phe Lys Leu Val Arg Arg Asn Ala Lys Val His Val	
820 825 830	
aca gaa aaa gaa tta gca gca ttt gat ttg gta gca aga gca ttt gat	2544
Thr Glu Lys Glu Leu Ala Ala Phe Asp Leu Val Ala Arg Ala Phe Asp	
835 840 845	
ctc tat cta gaa ttg aaa gaa ata tgt aat cat tca ctg aag aat tgt	2592
Leu Tyr Leu Glu Leu Lys Glu Ile Cys Asn His Ser Leu Lys Asn Cys	
850 855 860	
ggt ttc aaa aaa gag tgt gac tgt gag gat cca tgt aaa aag ata cag	2640
Gly Phe Lys Lys Glu Cys Asp Cys Glu Asp Pro Cys Lys Lys Ile Gln	
865 870 875 880	
gga ata tgt tca aca tta gag cca cta aaa gtg aga cca cac gaa ata	2688
Gly Ile Cys Ser Thr Leu Glu Pro Leu Lys Val Arg Pro His Glu Ile	
885 890 895	
gta act aaa aac ata aca act aca acc aca acc acc acc aca act acc	2736
Val Thr Lys Asn Ile Thr Thr Thr Thr Thr Thr Thr Thr Thr Thr	
900 905 910	
att aaa gac gca aag gca aca gac tgc cac tct tta cag aca aca gat	2784
Ile Lys Asp Ala Lys Ala Thr Asp Cys His Ser Leu Gln Thr Thr Asp	
915 920 925	
acg tgg gtc aca aag acg tcg acc cat act agc aca tcc aca acc aca	2832
Thr Trp Val Thr Lys Thr Ser Thr His Thr Ser Thr Ser Thr Thr Thr	
930 935 940	
tct aca gtc acg tca aga ata acg ttg acc tcg aca aga cgg tgt aag	2880
Ser Thr Val Thr Ser Arg Ile Thr Leu Thr Ser Thr Arg Arg Cys Lys	
945 950 955 960	

cct acg aag tgt acg aca gga gag gaa gat gaa gca gga gac gtg aaa 2928  
 Pro Thr Lys Cys Thr Thr Gly Glu Glu Asp Glu Ala Gly Asp Val Lys  
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ccg agt gaa ggg ttg agg atg agt gga tgg agt gtg atg agg ggg gtg 2976  
 Pro Ser Glu Gly Leu Arg Met Ser Gly Trp Ser Val Met Arg Gly Val  
                   980                                  985                                  990

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<212> PRT

<213> *Pneumocystis carinii* sp. f. *hominis*

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                   20                                  25                                  30

Asp Lys Cys Lys Lys Arg Leu Lys Glu Tyr Cys Glu Val Leu Lys Asn  
                   35                                  40                                  45

Val Thr Lys Glu Pro Lys Lys Leu Glu Glu Lys Leu Asp Gly Ile Cys  
   50                                  55                                  60

Lys Asp Asp Lys Thr Ile Glu Ala Lys Cys Lys Glu Ser Glu Thr Lys  
   65                                  70                                  75                                  80

Val Lys Ala Lys Cys Thr Ser Phe Gln Thr Glu Leu Asp Lys Ala Val  
                   85                                  90                                  95

Lys Lys Gly Ala Ser Thr Leu Glu Asp Asn Asp Cys Lys Lys Asn Glu  
                   100                                  105                                  110

Arg Gln Cys Leu Phe Leu Glu Gly Ala Cys Pro Thr Glu Leu Lys Asp  
                   115                                  120                                  125

Lys Cys Asn Glu Leu Arg Asn Lys Cys Tyr Gln Lys Lys Arg Asp Asp  
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Val Ala Glu Lys Ala Leu Leu Arg Val Leu Arg Gly Asn Leu Lys Asp  
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Lys Asn Thr Cys Lys Asn Lys Leu Lys Gly Val Cys Gln Glu Phe Asn  
                   165                                  170                                  175

Lys Glu Ser Asp Glu Leu Ile Lys Leu Cys Leu Asp Glu Glu Lys Thr  
                   180                                  185                                  190

Cys Gly Asp Leu Val Ser Lys Lys Glu Tyr Lys Cys Lys Pro Leu Lys  
                   195                                  200                                  205

Glu Gly Ile Asp Leu Val Leu Gly Lys Glu Asp Leu Leu Lys Glu Lys  
   210                                  215                                  220

Cys Leu Leu Phe Leu Glu Glu Cys Tyr Phe Tyr Gly Ser Asn Cys Glu  
 225 230 235 240  
 Thr Asp Gln Pro Lys Cys Lys Glu Phe Ala Ser Lys Cys Gln Lys Glu  
 245 250 255  
 Asn Leu Val Tyr Ala Ala Pro Gly Ser His Phe Asp Pro Thr Lys Leu  
 260 265 270  
 Lys Ile Arg Leu Ala Glu Glu Ile Asp Leu Glu Lys Leu Tyr Val Glu  
 275 280 285  
 Ala Val Lys Lys Gly Ile His Ile Gly Arg Pro Ser Ile Lys Asp Glu  
 290 295 300  
 Val Ala Leu Leu Ala Leu Leu Ser Lys Ser Asp Ala Gln Asn Thr Phe  
 305 310 315 320  
 Lys Asp Gln Cys Glu Asp Val Ile Lys Lys Lys Cys Gly Asn Phe Lys  
 325 330 335  
 Glu His Ile Ile Leu Lys Asp Leu Cys Ser Asn Lys Thr Ile Thr Asp  
 340 345 350  
 Asn Pro Lys Glu Lys Cys Glu Glu Leu Asn Lys Glu Leu Thr Thr Arg  
 355 360 365  
 Ile Leu Thr Val Ser Lys Arg Ile Glu Lys Tyr Phe Ala Pro Ala Asn  
 370 375 380  
 Val Lys Glu Ile Ile Gly Trp His Met Leu His Thr Phe Leu Gly Glu  
 385 390 395 400  
 Arg Glu Cys Thr Lys Leu Leu Ser Asp Cys Phe Tyr Leu Lys Ser Gln  
 405 410 415  
 Ala Pro Leu Glu Lys Pro Cys Asn Asn Leu Lys Ala Ala Cys Tyr Lys  
 420 425 430  
 Lys Gly Leu Glu Ala Val Ala Asn Glu Ala Leu Gln Asp Lys Leu Arg  
 435 440 445  
 Gly Lys Leu Gln Gly Ser Asn Arg Thr Trp Leu Glu Thr Leu Gln Lys  
 450 455 460  
 Asn Leu Val Lys Val Cys Glu Lys Thr Lys Gly Glu Ser Asp Glu Leu  
 465 470 475 480  
 Phe Val Leu Cys Met Asn Pro Ile Lys Thr Ala Leu Thr Val Ser Thr  
 485 490 495  
 Asp Leu Arg Met Arg Ala Val Ala Leu Gln Glu His Leu Asn Glu Lys  
 500 505 510  
 Arg Asp Phe Pro Thr Glu Lys Asp Cys Lys Glu Leu Glu Lys Lys Cys  
 515 520 525  
 Glu Val Leu Gly Lys Asp Ser Arg Glu Ile Lys Trp Ser Cys Tyr Thr  
 530 535 540  
 Leu Lys Gln His Cys Asn Arg Leu Lys Ser Ile Glu His Leu Glu Glu

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Glu Leu Leu Lys	Glu Asn Lys Gly Tyr Leu Lys Asp Glu Asn Ser Cys					
	565			570		575
Lys Glu Glu Ala Lys Lys Arg Cys Glu Lys Trp Phe Arg Arg Glu Asn						
	580			585		590
Asn Lys Phe Phe Ser Ala Cys Ser Asp Leu Glu Leu Val Cys Lys Lys						
	595			600		605
Ile Thr Arg Asn Val Glu Ser Lys Cys Asn Ile Leu Lys Gly His Met						
	610			615		620
Glu Thr Met Asn Val Ile Ser Glu Ile Ala Lys Lys Glu Glu Lys Ile						
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Cys Glu Phe Trp Ala Pro Tyr Cys Lys Lys Tyr Glu Gln Asn Cys Glu						
	645			650		655
Lys Leu Lys Asn Gly Gly Lys Asp Gly Gln Cys Lys Lys Leu Asn Lys						
	660			665		670
Lys Cys Lys Ser Phe Leu Glu Lys Glu Ala Leu Glu Asn Lys Val Val						
	675			680		685
Glu Glu Leu Lys Gly Ser Leu Ser Asn Val Gly Glu Cys Asn Asn Thr						
	690			695		700
Leu Asn Ile Tyr Cys Thr Gln Leu Lys Lys Ala Glu Asn Gly Leu Glu						
	705			710		720
Thr Leu Cys Lys Ser Lys Glu Asn Thr Lys Ser Asp Ile Lys Val Arg						
	725			730		735
Glu Glu Leu Cys Glu Lys Leu Ile Lys Arg Ile Lys Glu Lys Cys Ser						
	740			745		750
Lys Leu Lys Asp Glu Leu Glu Glu Val Lys Glu Val Leu Glu Lys Lys						
	755			760		765
Glu Glu Lys Tyr Lys Lys Ile Lys Glu Glu Ala Glu Lys Ala Met Glu						
	770			775		780
Asp Ala Asn Leu Ile Leu Ser Arg Ala Lys Gly Pro Asp Asn Asn Asn						
	785			790		800
Asn Lys Ser Val Asn Lys Asp Ser Ser Asp Thr Pro Lys Glu Gly Lys						
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Gly Thr Thr Gly Phe Lys Leu Val Arg Arg Asn Ala Lys Val His Val						
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Thr Glu Lys Glu Leu Ala Ala Phe Asp Leu Val Ala Arg Ala Phe Asp						
	835			840		845
Leu Tyr Leu Glu Leu Lys Glu Ile Cys Asn His Ser Leu Lys Asn Cys						
	850			855		860
Gly Phe Lys Lys Glu Cys Asp Cys Glu Asp Pro Cys Lys Lys Ile Gln						
	865			870		880

Gly Ile Cys Ser Thr Leu Glu Pro Leu Lys Val Arg Pro His Glu Ile  
885 890 895

Val Thr Lys Asn Ile Thr Thr Thr Thr Thr Thr Thr Thr Thr  
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Ile Lys Asp Ala Lys Ala Thr Asp Cys His Ser Leu Gln Thr Thr Asp  
915 920 925

Thr Trp Val Thr Lys Thr Ser Thr His Thr Ser Thr Ser Thr Thr Thr  
930 935 940

Ser Thr Val Thr Ser Arg Ile Thr Leu Thr Ser Thr Arg Arg Cys Lys  
945 950 955 960

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Leu Leu Ala Met Thr Ile Ser Phe Met Ile  
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&lt;210&gt; 5

&lt;211&gt; 3090

&lt;212&gt; DNA

<213> *Pneumocystis carinii* sp. f. *hominis*

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gat aca aaa tgc aaa act aag ttg gaa gaa tat tgc aaa aca tta aca	144
Asp Thr Lys Cys Lys Thr Lys Leu Glu Glu Tyr Cys Lys Thr Leu Thr	
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aat gca gga tta aat cca gaa aaa gtt cac gaa aaa tta aaa gat ttc	192
Asn Ala Gly Leu Asn Pro Glu Lys Val His Glu Lys Leu Lys Asp Phe	
50 55 60	
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Cys Asp Asn Gly Lys Arg Asn Glu Lys Cys Gln Asp Leu Lys Asn Lys	
65 70 75 80	
gtc aat caa aaa tgc att aaa ttt caa gga aaa ctt caa aca gct gct	288
Val Asn Gln Lys Cys Ile Lys Phe Gln Gly Lys Leu Gln Thr Ala Ala	
85 90 95	
gga aaa aaa att tca gaa tta aca gat gag gat tgc aaa aag aat gaa	336



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			100					105						110		
caa	caa	tgc	cta	ttt	ttg	gag	gga	gca	tgt	cca	aca	gaa	ctt	aaa	gat	384
Gln	Gln	Cys	Leu	Phe	Leu	Glu	Gly	Ala	Cys	Pro	Thr	Glu	Leu	Lys	Asp	
		115					120					125				
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Asp	Cys	Asn	Lys	Leu	Arg	Asn	Asn	Cys	Tyr	Gln	Lys	Glu	Arg	Asn	Asn	
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Thr	Lys	Thr	Cys	Glu	Lys	Lys	Leu	Lys	Glu	Val	Cys	Pro	Lys	Leu	Glu	
				165					170					175		
aga	gaa	agc	gat	gaa	tta	acg	gag	ctt	tgt	ctt	tat	caa	aaa	aca	aca	576
Arg	Glu	Ser	Asp	Glu	Leu	Thr	Glu	Leu	Cys	Leu	Tyr	Gln	Lys	Thr	Thr	
			180					185					190			
tgc	gta	agt	ctt	gta	aca	aaa	gga	aaa	agt	aaa	tgt	gat	act	ctt	gaa	624
Cys	Val	Ser	Leu	Val	Thr	Lys	Gly	Lys	Ser	Lys	Cys	Asp	Thr	Leu	Glu	
		195					200					205				
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Lys	Glu	Val	Glu	Glu	Ala	Leu	Lys	Lys	Asn	Glu	Leu	Arg	Glu	Lys	Cys	
		210				215					220					
cta	cta	tta	ctt	gag	caa	tgt	tac	ttt	cac	aga	ggg	aac	tgt	gaa	gga	720
Leu	Leu	Leu	Leu	Glu	Gln	Cys	Tyr	Phe	His	Arg	Gly	Asn	Cys	Glu	Gly	
225					230					235					240	
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Asp	Lys	Ser	Lys	Cys	Asn	Lys	Pro	Asn	Asn	Lys	Asp	Cys	Lys	Glu	Tyr	
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gta	cca	gag	tgt	gat	gaa	tta	gca	gaa	aag	tgt	gga	aaa	gaa	aat	att	816
Val	Pro	Glu	Cys	Asp	Glu	Leu	Ala	Glu	Lys	Cys	Gly	Lys	Glu	Asn	Ile	
			260					265					270			
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Val	Tyr	Met	His	Pro	Gly	Ser	Asp	Phe	Asp	Pro	Thr	Lys	Pro	Glu	Pro	
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Thr	Leu	Ala	Glu	Asp	Ile	Gly	Leu	Glu	Glu	Leu	Tyr	Lys	Arg	Ala	Glu	
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Glu	Asp	Gly	Ile	Phe	Val	Gly	Arg	Gln	His	Val	Arg	Asp	Ala	Thr	Ala	
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ttg	ttg	gca	cta	ctt	ctt	aag	aaa	acc	ctt	aaa	aaa	gaa	gaa	tgt	ata	1008
Leu	Leu	Ala	Leu	Leu	Leu	Lys	Lys	Thr	Leu	Lys	Lys	Glu	Glu	Cys	Ile	
				325					330					335		
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tca aca att ctt aaa aac cgt ctt tac att tca cct gat gga att gcg Ser Thr Ile Leu Lys Asn Arg Leu Tyr Ile Ser Pro Asp Gly Ile Ala 385 390 395 400			1200
gaa tgg gga aaa tta ccg aca ttt ctt agt gat gaa gat tgt gca aaa Glu Trp Gly Lys Leu Pro Thr Phe Leu Ser Asp Glu Asp Cys Ala Lys 405 410 415			1248
cta gaa tct tat tgc ttt tat tat aaa gaa act tgt cca gat gtc aaa Leu Glu Ser Tyr Cys Phe Tyr Tyr Lys Glu Thr Cys Pro Asp Val Lys 420 425 430			1296
gaa gct tgt atg aat gtg agg gca gcg tgt tat aag aga ggg ctt gat Glu Ala Cys Met Asn Val Arg Ala Ala Cys Tyr Lys Arg Gly Leu Asp 435 440 445			1344
gca cgg gca aac agt gtg ttg caa aaa aat atg cga ggg tta ttg cat Ala Arg Ala Asn Ser Val Leu Gln Lys Asn Met Arg Gly Leu Leu His 450 455 460			1392
ggc tca aat aaa gat tgg ctt aag aaa ttt caa caa gaa tta gca aaa Gly Ser Asn Lys Asp Trp Leu Lys Lys Phe Gln Gln Glu Leu Ala Lys 465 470 475 480			1440
gta tgt gag aaa ctg aaa gga aat aaa gga agt ttc tcg aac gat gaa Val Cys Glu Lys Leu Lys Gly Asn Lys Gly Ser Phe Ser Asn Asp Glu 485 490 495			1488
ttg ttt gtt ctg tgt ata caa cca gca aag gca gca cga tta ctt aca Leu Phe Val Leu Cys Ile Gln Pro Ala Lys Ala Ala Arg Leu Leu Thr 500 505 510			1536
cat cac cat caa atg aga gtt atc ttt tta cga caa caa ctg gat caa His His His Gln Met Arg Val Ile Phe Leu Arg Gln Gln Leu Asp Gln 515 520 525			1584
aag aga gat ttt ccg aca gat aaa gac tgc aag gaa tta ggg aga aaa Lys Arg Asp Phe Pro Thr Asp Lys Asp Cys Lys Glu Leu Gly Arg Lys 530 535 540			1632
tgc caa gat tta gga aag gat tca aaa gaa att aca tgg cca tgt cat Cys Gln Asp Leu Gly Lys Asp Ser Lys Glu Ile Thr Trp Pro Cys His 545 550 555 560			1680
aca cta gaa cag caa tgc aat cgc tta ggg att aca gaa att tta aaa Thr Leu Glu Gln Gln Cys Asn Arg Leu Gly Ile Thr Glu Ile Leu Lys 565 570 575			1728
cag att tta ttg gat gaa cac aaa gat act ttg aaa agt cat gaa aac Gln Ile Leu Leu Asp Glu His Lys Asp Thr Leu Lys Ser His Glu Asn 580 585 590			1776

tgt gca aaa tat tta aaa aga aaa tgc cat aaa tgg tct aga agg ggt	1824
Cys Ala Lys Tyr Leu Lys Arg Lys Cys His Lys Trp Ser Arg Arg Gly	
595 600 605	
gat gat cgt ttt tct ttt gta tgt gtt ttc caa aac gct aca tgt gag	1872
Asp Asp Arg Phe Ser Phe Val Cys Val Phe Gln Asn Ala Thr Cys Glu	
610 615 620	
ctg atg gta aaa gac gtg caa gat agg tgc aaa ata ttc gaa gaa aat	1920
Leu Met Val Lys Asp Val Gln Asp Arg Cys Lys Ile Phe Glu Glu Asn	
625 630 635 640	
atg caa gca tca gat att aat gat tcc ctt aaa aaa aat caa ata aaa	1968
Met Gln Ala Ser Asp Ile Asn Asp Ser Leu Lys Lys Asn Gln Ile Lys	
645 650 655	
gca gaa tca gca gca aat att tgt ccc tca tgg cat cca tac tgc gat	2016
Ala Glu Ser Ala Ala Asn Ile Cys Pro Ser Trp His Pro Tyr Cys Asp	
660 665 670	
aga ttt tta ccc aat tgt cct gat ctt aag aaa gga aaa act ttc tgt	2064
Arg Phe Leu Pro Asn Cys Pro Asp Leu Lys Lys Gly Lys Thr Phe Cys	
675 680 685	
caa aat ctt aaa aaa tat tgc gaa cca ttc tac aaa aga aag gtt tta	2112
Gln Asn Leu Lys Lys Tyr Cys Glu Pro Phe Tyr Lys Arg Lys Val Leu	
690 695 700	
gaa gat gct ctt aaa gta gag ctt cga gga aat tta agt aat ata act	2160
Glu Asp Ala Leu Lys Val Glu Leu Arg Gly Asn Leu Ser Asn Ile Thr	
705 710 715 720	
aaa tgt gaa cct gca tta gaa aga tat tgt aca gta ttg aaa gac gta	2208
Lys Cys Glu Pro Ala Leu Glu Arg Tyr Cys Thr Val Leu Lys Asp Val	
725 730 735	
aat aat gcg tca atc agc agt tta tgt aaa gat aat acc gaa agt aaa	2256
Asn Asn Ala Ser Ile Ser Ser Leu Cys Lys Asp Asn Thr Glu Ser Lys	
740 745 750	
act aaa aag gcc gat aat aaa aat gtt aga aag aag ctt tgt cta aaa	2304
Thr Lys Lys Ala Asp Asn Lys Asn Val Arg Lys Lys Leu Cys Leu Lys	
755 760 765	
tta gtg gaa gag gtg gaa cag caa tgc aaa gta tta cca aca gaa tta	2352
Leu Val Glu Glu Val Glu Gln Gln Cys Lys Val Leu Pro Thr Glu Leu	
770 775 780	
aca gag ctg gaa aaa agt cta aaa aaa gat gtt aag aca tat gag gaa	2400
Thr Glu Leu Glu Lys Ser Leu Lys Lys Asp Val Lys Thr Tyr Glu Glu	
785 790 795 800	
ctt aag gaa agg gca aaa aaa gca atg aac aag tcc agc ctt gtt tta	2448
Leu Lys Glu Arg Ala Lys Lys Ala Met Asn Lys Ser Ser Leu Val Leu	
805 810 815	
tca ctt gtt aag aaa aac gaa agt aat aca tcg aaa aat aat agc aaa	2496
Ser Leu Val Lys Lys Asn Glu Ser Asn Thr Ser Lys Asn Asn Ser Lys	
820 825 830	

aac aag gat aag aat gtc gtt tca aac gga ctt caa gat acc aca aaa 2544  
 Asn Lys Asp Lys Asn Val Val Ser Asn Gly Leu Gln Asp Thr Thr Lys  
 835 840 845

tat gtg aaa ata cta cga aga gga gtt aag gag gca ctt gta aca gaa 2592  
 Tyr Val Lys Ile Leu Arg Arg Gly Val Lys Glu Ala Leu Val Thr Glu  
 850 855 860

tct gaa gcc aag gca ttt gat ttg gca gca gaa gtg ttt gga aga tat 2640  
 Ser Glu Ala Lys Ala Phe Asp Leu Ala Ala Glu Val Phe Gly Arg Tyr  
 865 870 875 880

gta gac ttg aaa gaa aaa tgt gag aaa ttg act tcg gat tgc ggg att 2688  
 Val Asp Leu Lys Glu Lys Cys Glu Lys Leu Thr Ser Asp Cys Gly Ile  
 885 890 895

aaa gac gat tgc gat ggt tta aaa gaa gtg tgt gga aag att gag aag 2736  
 Lys Asp Asp Cys Asp Gly Leu Lys Glu Val Cys Gly Lys Ile Glu Lys  
 900 905 910

aca tgt cac gat ctg aag cct ctg gag gtg aag tcg cat gaa ata gtc 2784  
 Thr Cys His Asp Leu Lys Pro Leu Glu Val Lys Ser His Glu Ile Val  
 915 920 925

aca gaa agc aca acg acg acc aca acg aca aca acg acc gtt acc gat 2832  
 Thr Glu Ser Thr Thr Thr Thr Thr Thr Thr Thr Thr Thr Val Thr Asp  
 930 935 940

ccg aag gca aca gaa tgc aaa tcc tta cag aca aca gat aca tgg gtt 2880  
 Pro Lys Ala Thr Glu Cys Lys Ser Leu Gln Thr Thr Asp Thr Trp Val  
 945 950 955 960

aca cag aca tcg aca cac aca agc acg tct acc atc aca tct acc atc 2928  
 Thr Gln Thr Ser Thr His Thr Ser Thr Ser Thr Ile Thr Ser Thr Ile  
 965 970 975

aca tca aaa ata aca ttg aca tca acg agg cga tgc aaa cca acc aag 2976  
 Thr Ser Lys Ile Thr Leu Thr Ser Thr Arg Arg Cys Lys Pro Thr Lys  
 980 985 990

tgt acg aca ggg gat gaa gca gga gac gtg aaa ccg agt gag gga ttg 3024  
 Cys Thr Thr Gly Asp Glu Ala Gly Asp Val Lys Pro Ser Glu Gly Leu  
 995 1000 1005

aag atg agt ggg tgg agc gtg atg agg ggg gtg ata gta gca atg gtt 3072  
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&lt;212&gt; PRT

<213> *Pneumocystis carinii* sp. f. *hominis*

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 Asp Thr Lys Cys Lys Thr Lys Leu Glu Glu Tyr Cys Lys Thr Leu Thr  
                             35                            40                            45  
 Asn Ala Gly Leu Asn Pro Glu Lys Val His Glu Lys Leu Lys Asp Phe  
                             50                            55                            60  
 Cys Asp Asn Gly Lys Arg Asn Glu Lys Cys Gln Asp Leu Lys Asn Lys  
                             65                            70                            75                            80  
 Val Asn Gln Lys Cys Ile Lys Phe Gln Gly Lys Leu Gln Thr Ala Ala  
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 Gly Lys Lys Ile Ser Glu Leu Thr Asp Glu Asp Cys Lys Lys Asn Glu  
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 Gln Gln Cys Leu Phe Leu Glu Gly Ala Cys Pro Thr Glu Leu Lys Asp  
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 Asp Cys Asn Lys Leu Arg Asn Asn Cys Tyr Gln Lys Glu Arg Asn Asn  
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 Val Ala Glu Glu Val Leu Leu Arg Ala Leu Arg Gly Asp Leu Asn Glu  
                             145                            150                            155                            160  
 Thr Lys Thr Cys Glu Lys Lys Leu Lys Glu Val Cys Pro Lys Leu Glu  
                             165                            170                            175  
 Arg Glu Ser Asp Glu Leu Thr Glu Leu Cys Leu Tyr Gln Lys Thr Thr  
                             180                            185                            190  
 Cys Val Ser Leu Val Thr Lys Gly Lys Ser Lys Cys Asp Thr Leu Glu  
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 Lys Glu Val Glu Glu Ala Leu Lys Lys Asn Glu Leu Arg Glu Lys Cys  
                             210                            215                            220  
 Leu Leu Leu Leu Glu Gln Cys Tyr Phe His Arg Gly Asn Cys Glu Gly  
                             225                            230                            235                            240  
 Asp Lys Ser Lys Cys Asn Lys Pro Asn Asn Lys Asp Cys Lys Glu Tyr  
                             245                            250                            255  
 Val Pro Glu Cys Asp Glu Leu Ala Glu Lys Cys Gly Lys Glu Asn Ile  
                             260                            265                            270  
 Val Tyr Met His Pro Gly Ser Asp Phe Asp Pro Thr Lys Pro Glu Pro  
                             275                            280                            285  
 Thr Leu Ala Glu Asp Ile Gly Leu Glu Glu Leu Tyr Lys Arg Ala Glu  
                             290                            295                            300  
 Glu Asp Gly Ile Phe Val Gly Arg Gln His Val Arg Asp Ala Thr Ala  
                             305                            310                            315                            320  
 Leu Leu Ala Leu Leu Leu Lys Lys Thr Leu Lys Lys Glu Glu Cys Ile  
                             325                            330                            335

Lys Ala Leu Lys Lys Asn Cys Glu Asn Pro His Glu His Glu Ala Leu  
 340 345 350  
 Glu Asn Leu Cys Lys Glu Asn Lys Pro Ser Ser Asp Gly Thr Lys Lys  
 355 360 365  
 Cys Asp Glu Leu Glu Lys Asp Val Asn Lys Thr Cys Thr Ser Leu Thr  
 370 375 380  
 Ser Thr Ile Leu Lys Asn Arg Leu Tyr Ile Ser Pro Asp Gly Ile Ala  
 385 390 395 400  
 Glu Trp Gly Lys Leu Pro Thr Phe Leu Ser Asp Glu Asp Cys Ala Lys  
 405 410 415  
 Leu Glu Ser Tyr Cys Phe Tyr Tyr Lys Glu Thr Cys Pro Asp Val Lys  
 420 425 430  
 Glu Ala Cys Met Asn Val Arg Ala Ala Cys Tyr Lys Arg Gly Leu Asp  
 435 440 445  
 Ala Arg Ala Asn Ser Val Leu Gln Lys Asn Met Arg Gly Leu Leu His  
 450 455 460  
 Gly Ser Asn Lys Asp Trp Leu Lys Lys Phe Gln Gln Glu Leu Ala Lys  
 465 470 475 480  
 Val Cys Glu Lys Leu Lys Gly Asn Lys Gly Ser Phe Ser Asn Asp Glu  
 485 490 495  
 Leu Phe Val Leu Cys Ile Gln Pro Ala Lys Ala Ala Arg Leu Leu Thr  
 500 505 510  
 His His His Gln Met Arg Val Ile Phe Leu Arg Gln Gln Leu Asp Gln  
 515 520 525  
 Lys Arg Asp Phe Pro Thr Asp Lys Asp Cys Lys Glu Leu Gly Arg Lys  
 530 535 540  
 Cys Gln Asp Leu Gly Lys Asp Ser Lys Glu Ile Thr Trp Pro Cys His  
 545 550 555 560  
 Thr Leu Glu Gln Gln Cys Asn Arg Leu Gly Ile Thr Glu Ile Leu Lys  
 565 570 575  
 Gln Ile Leu Leu Asp Glu His Lys Asp Thr Leu Lys Ser His Glu Asn  
 580 585 590  
 Cys Ala Lys Tyr Leu Lys Arg Lys Cys His Lys Trp Ser Arg Arg Gly  
 595 600 605  
 Asp Asp Arg Phe Ser Phe Val Cys Val Phe Gln Asn Ala Thr Cys Glu  
 610 615 620  
 Leu Met Val Lys Asp Val Gln Asp Arg Cys Lys Ile Phe Glu Glu Asn  
 625 630 635 640  
 Met Gln Ala Ser Asp Ile Asn Asp Ser Leu Lys Lys Asn Gln Ile Lys  
 645 650 655  
 Ala Glu Ser Ala Ala Asn Ile Cys Pro Ser Trp His Pro Tyr Cys Asp  
 22

660	665	670
Arg Phe Leu Pro Asn Cys Pro Asp Leu Lys Lys Gly Lys Thr Phe Cys		
675	680	685
Gln Asn Leu Lys Lys Tyr Cys Glu Pro Phe Tyr Lys Arg Lys Val Leu		
690	695	700
Glu Asp Ala Leu Lys Val Glu Leu Arg Gly Asn Leu Ser Asn Ile Thr		
705	710	715
Lys Cys Glu Pro Ala Leu Glu Arg Tyr Cys Thr Val Leu Lys Asp Val		
725	730	735
Asn Asn Ala Ser Ile Ser Ser Leu Cys Lys Asp Asn Thr Glu Ser Lys		
740	745	750
Thr Lys Lys Ala Asp Asn Lys Asn Val Arg Lys Lys Leu Cys Leu Lys		
755	760	765
Leu Val Glu Glu Val Glu Gln Gln Cys Lys Val Leu Pro Thr Glu Leu		
770	775	780
Thr Glu Leu Glu Lys Ser Leu Lys Lys Asp Val Lys Thr Tyr Glu Glu		
785	790	795
Leu Lys Glu Arg Ala Lys Lys Ala Met Asn Lys Ser Ser Leu Val Leu		
805	810	815
Ser Leu Val Lys Lys Asn Glu Ser Asn Thr Ser Lys Asn Asn Ser Lys		
820	825	830
Asn Lys Asp Lys Asn Val Val Ser Asn Gly Leu Gln Asp Thr Thr Lys		
835	840	845
Tyr Val Lys Ile Leu Arg Arg Gly Val Lys Glu Ala Leu Val Thr Glu		
850	855	860
Ser Glu Ala Lys Ala Phe Asp Leu Ala Ala Glu Val Phe Gly Arg Tyr		
865	870	875
Val Asp Leu Lys Glu Lys Cys Glu Lys Leu Thr Ser Asp Cys Gly Ile		
885	890	895
Lys Asp Asp Cys Asp Gly Leu Lys Glu Val Cys Gly Lys Ile Glu Lys		
900	905	910
Thr Cys His Asp Leu Lys Pro Leu Glu Val Lys Ser His Glu Ile Val		
915	920	925
Thr Glu Ser Thr Thr Thr Thr Thr Thr Thr Thr Thr Thr Val Thr Asp		
930	935	940
Pro Lys Ala Thr Glu Cys Lys Ser Leu Gln Thr Thr Asp Thr Trp Val		
945	950	955
Thr Gln Thr Ser Thr His Thr Ser Thr Ser Thr Ile Thr Ser Thr Ile		
965	970	975
Thr Ser Lys Ile Thr Leu Thr Ser Thr Arg Arg Cys Lys Pro Thr Lys		
980	985	990

Cys Thr Thr Gly Asp Glu Ala Gly Asp Val Lys Pro Ser Glu Gly Leu  
 995 1000 1005

Lys Met Ser Gly Trp Ser Val Met Arg Gly Val Ile Val Ala Met Val  
 1010 1015 1020

Ile Ser Phe Met Ile  
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<211> 3084

<212> DNA

<213> *Pneumocystis carinii* sp. f. hominis

<220>

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gat gag gag cat gtt tta gct ttg att tta aaa aaa aat gga tta gaa 96  
 Asp Glu Glu His Val Leu Ala Leu Ile Leu Lys Lys Asn Gly Leu Glu  
 20 25 30

gat aca aaa tgc aaa act aag ttg gaa gaa tat tgc aaa aca tta aca 144  
 Asp Thr Lys Cys Lys Thr Lys Leu Glu Glu Tyr Cys Lys Thr Leu Thr  
 35 40 45

aat gca gga tta aat cca gaa aaa gtt cac gaa aaa tta aaa gat ttc 192  
 Asn Ala Gly Leu Asn Pro Glu Lys Val His Glu Lys Leu Lys Asp Phe  
 50 55 60

tgt gat aac ggg aaa cga aat gaa aaa tgt caa gat cta aaa aac aaa 240  
 Cys Asp Asn Gly Lys Arg Asn Glu Lys Cys Gln Asp Leu Lys Asn Lys  
 65 70 75 80

gtc aat caa aaa tgc att aaa ttt caa gga aaa ctt caa aca gct gct 288  
 Val Asn Gln Lys Cys Ile Lys Phe Gln Gly Lys Leu Gln Thr Ala Ala  
 85 90 95

aga aaa aaa att tca gaa tta aca gat gag gat tgc aaa aag aat gaa 336  
 Arg Lys Lys Ile Ser Glu Leu Thr Asp Glu Asp Cys Lys Lys Asn Glu  
 100 105 110

caa caa tgc cta ttt ttg gag gga gca tgt cca aca gaa ctt aaa gat 384  
 Gln Gln Cys Leu Phe Leu Glu Gly Ala Cys Pro Thr Glu Leu Lys Asp  
 115 120 125

gac tgc aat aaa tta agg aat aac tgt tat caa aaa gaa cgg aac aat 432  
 Asp Cys Asn Lys Leu Arg Asn Asn Cys Tyr Gln Lys Glu Arg Asn Asn  
 130 135 140

gtg gca gaa gaa gtt ctt ttg agg gcg ctt cgt ggt gat ctc aat gaa 480  
 Val Ala Glu Glu Val Leu Leu Arg Ala Leu Arg Gly Asp Leu Asn Glu  
 145 150 155 160



aca aag aca tgt gaa aaa aaa ctg aaa gaa gtt tgc ccg aaa tta gaa	528
Thr Lys Thr Cys Glu Lys Lys Leu Lys Glu Val Cys Pro Lys Leu Glu	
165 170 175	
aga gaa agc gat gaa tta acg gag ctt tgt ctt tat caa aaa aca aca	576
Arg Glu Ser Asp Glu Leu Thr Glu Leu Cys Leu Tyr Gln Lys Thr Thr	
180 185 190	
tgc gta agt ctt gta aca aaa gga aaa agt aaa tgt gat act ctt gaa	624
Cys Val Ser Leu Val Thr Lys Gly Lys Ser Lys Cys Asp Thr Leu Glu	
195 200 205	
aaa gaa gtt gaa gaa gca ctt aag aag aat gaa ttg cga gaa aaa tgt	672
Lys Glu Val Glu Glu Ala Leu Lys Lys Asn Glu Leu Arg Glu Lys Cys	
210 215 220	
cta cta tta ctt gag caa tgt tac ttt cac aga ggg aac tgt gaa gga	720
Leu Leu Leu Leu Glu Gln Cys Tyr Phe His Arg Gly Asn Cys Glu Gly	
225 230 235 240	
gac aaa tca aag tgc aat aaa cct aat aat aaa gac tgc aaa gaa tat	768
Asp Lys Ser Lys Cys Asn Lys Pro Asn Asn Lys Asp Cys Lys Glu Tyr	
245 250 255	
gta cca gag tgt gat gaa tta gca gaa aag tgt gga aaa gaa aat att	816
Val Pro Glu Cys Asp Glu Leu Ala Glu Lys Cys Gly Lys Glu Asn Ile	
260 265 270	
gtt tat atg cat cca gga tcc gat ttc gat cca act aag cca gag cct	864
Val Tyr Met His Pro Gly Ser Asp Phe Asp Pro Thr Lys Pro Glu Pro	
275 280 285	
aca cta gca gag gac ata ggg ctg gaa gag ctt tat aag agg gca gaa	912
Thr Leu Ala Glu Asp Ile Gly Leu Glu Glu Leu Tyr Lys Arg Ala Glu	
290 295 300	
gag gat gga att ttt gtt gga aga caa cat gta aga gat gca aca gct	960
Glu Asp Gly Ile Phe Val Gly Arg Gln His Val Arg Asp Ala Thr Ala	
305 310 315 320	
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Leu Leu Ala Leu Leu Leu Lys Lys Thr Leu Lys Lys Glu Glu Cys Ile	
325 330 335	
aaa gcc ctt aaa aaa aac tgc gaa aac cct cat gaa cat gag gcc tta	1056
Lys Ala Leu Lys Lys Asn Cys Glu Asn Pro His Glu His Glu Ala Leu	
340 345 350	
gaa aat cta tgt aag gaa aat aaa cca agt agt gat gga acg aaa aaa	1104
Glu Asn Leu Cys Lys Glu Asn Lys Pro Ser Ser Asp Gly Thr Lys Lys	
355 360 365	
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Cys Asp Glu Leu Glu Lys Asp Val Asn Lys Thr Cys Thr Ser Leu Thr	
370 375 380	
tca aca att ctt aaa aac cgt ctt tac att tca cct gat gga att gcg	1200
Ser Thr Ile Leu Lys Asn Arg Leu Tyr Ile Ser Pro Asp Gly Ile Ala	
385 390 395 400	
gaa tgg gga aaa tta ccg aca ttt ctt agt gat gaa gat tgt gca aaa	1248

Glu	Trp	Gly	Lys	Leu	Pro	Thr	Phe	Leu	Ser	Asp	Glu	Asp	Cys	Ala	Lys	
				405					410					415		
cta	gaa	tct	tat	tgc	ttt	tat	tat	aaa	gaa	act	tgt	cca	gat	gtc	aaa	1296
Leu	Glu	Ser	Tyr	Cys	Phe	Tyr	Tyr	Lys	Glu	Thr	Cys	Pro	Asp	Val	Lys	
			420					425					430			
gaa	gct	tgt	atg	aat	gtg	agg	gca	gcg	tgt	tac	aag	aga	ggg	ctt	gat	1344
Glu	Ala	Cys	Met	Asn	Val	Arg	Ala	Ala	Cys	Tyr	Lys	Arg	Gly	Leu	Asp	
			435				440					445				
gca	cgg	gca	aac	agt	gtg	ttg	caa	aaa	aat	atg	cgt	ggg	tta	tta	cgt	1392
Ala	Arg	Ala	Asn	Ser	Val	Leu	Gln	Lys	Asn	Met	Arg	Gly	Leu	Leu	Arg	
			450			455					460					
ggt	tca	aat	caa	agt	tgg	ctt	aag	gag	ttt	caa	caa	aga	tta	gta	aaa	1440
Gly	Ser	Asn	Gln	Ser	Trp	Leu	Lys	Glu	Phe	Gln	Gln	Arg	Leu	Val	Lys	
					470					475					480	
gta	tgt	aag	gag	cta	aaa	gaa	aat	aaa	gga	agt	ttc	cca	aac	gat	gaa	1488
Val	Cys	Lys	Glu	Leu	Lys	Glu	Asn	Lys	Gly	Ser	Phe	Pro	Asn	Asp	Glu	
				485					490					495		
ata	ttt	gtt	ctg	tgt	gta	cag	cca	gca	aaa	gct	gca	cga	tta	ctt	aca	1536
Ile	Phe	Val	Leu	Cys	Val	Gln	Pro	Ala	Lys	Ala	Ala	Arg	Leu	Leu	Thr	
			500					505					510			
cac	gat	cat	caa	atg	agg	gtt	acc	ttt	tta	cga	caa	caa	ttg	gat	caa	1584
His	Asp	His	Gln	Met	Arg	Val	Thr	Phe	Leu	Arg	Gln	Gln	Leu	Asp	Gln	
			515				520					525				
aag	aga	gat	ttt	ccg	aca	gat	aaa	gac	tgc	aag	gaa	cta	ggg	aaa	aaa	1632
Lys	Arg	Asp	Phe	Pro	Thr	Asp	Lys	Asp	Cys	Lys	Glu	Leu	Gly	Lys	Lys	
			530			535					540					
tgc	caa	gat	tta	gga	aag	gat	tca	aaa	gaa	att	aca	tgg	cca	tgt	cat	1680
Cys	Gln	Asp	Leu	Gly	Lys	Asp	Ser	Lys	Glu	Ile	Thr	Trp	Pro	Cys	His	
					550					555					560	
aca	ctg	gag	cag	caa	tgc	aat	cgc	ttg	ggg	act	aca	gaa	att	tta	aag	1728
Thr	Leu	Glu	Gln	Gln	Cys	Asn	Arg	Leu	Gly	Thr	Thr	Glu	Ile	Leu	Lys	
				565					570					575		
cag	gtt	tta	ttg	gat	gaa	cac	aaa	gat	act	ttg	aaa	gac	caa	gaa	agt	1776
Gln	Val	Leu	Leu	Asp	Glu	His	Lys	Asp	Thr	Leu	Lys	Asp	Gln	Glu	Ser	
			580				585						590			
tgt	gta	aaa	tac	cta	aaa	gaa	aag	tgt	aat	aaa	tgg	tct	aga	aga	gga	1824
Cys	Val	Lys	Tyr	Leu	Lys	Glu	Lys	Cys	Asn	Lys	Trp	Ser	Arg	Arg	Gly	
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Asp	Asp	Arg	Phe	Ser	Phe	Val	Cys	Val	Phe	Gln	Asn	Ala	Thr	Cys	Glu	
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ctg	atg	gta	aaa	gac	gtg	aaa	gac	agg	tgt	gaa	gta	ttc	aaa	aaa	aat	1920
Leu	Met	Val	Lys	Asp	Val	Lys	Asp	Arg	Cys	Glu	Val	Phe	Lys	Lys	Asn	
			625			630				635					640	
ata	aaa	gct	tca	tat	att	att	gaa	ttt	ctt	gaa	aat	aat	aca	aat	aaa	1968
Ile	Lys	Ala	Ser	Tyr	Ile	Ile	Glu	Phe	Leu	Glu	Asn	Asn	Thr	Asn	Lys	

				645				650				655							
ata Ile	aca Thr	aca Thr	ctg Leu 660	gaa Glu	aga Arg	aat Asn	tgt Cys	ccc Pro 665	tct Ser	tgg Trp	cat His	acg Thr	tat Tyr 670	tgc Cys	aat Asn	2016			
aga Arg	ttt Phe	tca Ser 675	cct Pro	aat Asn	tgt Cys	cca Pro	ggc Gly 680	ctt Leu	acg Thr	aaa Lys	gag Glu	aat Asn 685	agt Ser	tgt Cys	aca Thr	2064			
aaa Lys	atc Ile 690	aag Lys	aag Lys	cat His	tgt Cys	gag Glu 695	ccg Pro	ttc Phe	tat Tyr	aaa Lys	aga Arg 700	aag Lys	gcc Ala	ttg Leu	gaa Glu	2112			
gat Asp 705	gct Ala	ctc Leu	aaa Lys	gta Val	gag Glu 710	ctt Leu	caa Gln	gga Gly	aaa Lys	ttg Leu 715	act Thr	gat Asp	aaa Lys	tct Ser	aaa Lys 720	2160			
tgt Cys	gaa Glu	cct Pro	gca Ala	ttg Leu 725	aac Asn	aga Arg	tat Tyr	tgt Cys	aca Thr 730	gta Val	gcg Ala	gga Gly	aac Asn	gta Val 735	aat Asn	2208			
aat Asn	gcg Ala	tca Ser	atc Ile 740	agt Ser	ggc Gly	tta Leu	tgc Cys	aaa Lys 745	gct Ala	aac Asn	acc Thr	aag Lys	gat Asp 750	aac Asn	tct Ser	2256			
gga Gly	aag Lys	agt Ser 755	gat Asp	gag Glu	gat Asp	gct Ala	aga Arg 760	aag Lys	gaa Glu	ctc Leu	tgt Cys	gag Glu 765	aaa Lys	tca Ser	gtg Val	2304			
aaa Lys	gaa Glu 770	gtg Val	gaa Glu	gaa Glu	cag Gln	tgc Cys 775	aaa Lys	gca Ala	tta Leu	cca Pro	aca Thr 780	gaa Glu	tta Leu	gga Gly	caa Gln	2352			
ccg Pro 785	gca Ala	gct Ala	gat Asp	cta Leu	aaa Lys 790	aaa Lys	gat Asp	tat Tyr	aag Lys	aca Thr 795	tat Tyr	gag Glu	gaa Glu	ctt Leu	aag Lys 800	2400			
aaa Lys	cgt Arg	gca Ala	gag Glu	gaa Glu 805	gca Ala	atg Met	aac Asn	aag Lys	tcc Ser 810	agt Ser	ctt Leu	gtt Val	ttg Leu	tca Ser 815	ctc Leu	2448			
att Ile	aag Lys	aaa Lys	aac Asn 820	gaa Glu	agt Ser	aat Asn	gta Val	tca Ser 825	aaa Lys	agt Ser	aat Asn	agc Ser	aaa Lys 830	aac Asn	aag Lys	2496			
gat Asp	aag Lys	aat Asn 835	gcc Ala	gtt Val	tca Ser	aac Asn	gga Gly 840	ctt Leu	caa Gln	gat Asp	acc Thr	aca Thr 845	aaa Lys	cat His	gtg Val	2544			
aaa Lys	ata Ile 850	cta Leu	cgg Arg	aga Arg	gga Gly	gtt Val 855	aag Lys	gat Asp	gta Val	tcc Ser	gta Val 860	aca Thr	gaa Glu	tta Leu	gaa Glu	2592			
gct Ala 865	aaa Lys	gca Ala	ttt Phe	gat Asp	ttg Leu 870	gca Ala	gca Ala	gaa Glu	gta Val	ttt Phe 875	gga Gly	aga Arg	tat Tyr	gta Val	gat Asp 880	2640			
ttg Leu	aag Lys	gaa Glu	aga Arg	tgt Cys 885	aat Asn	aaa Lys	ttg Leu	gaa Glu 890	tca Ser	gat Asp	tgc Cys	aga Arg	att Ile	aag Lys 895	gag Glu	2688			

gat tgc aaa gac tta gaa gaa gta tgc aaa aag att aat aag gct tgt 2736  
 Asp Cys Lys Asp Leu Glu Glu Val Cys Lys Lys Ile Asn Lys Ala Cys  
 900 905 910

cgc aat ctg aag cct ctg gag gtg aag ccg cac gaa aca gtg aca gaa 2784  
 Arg Asn Leu Lys Pro Leu Glu Val Lys Pro His Glu Thr Val Thr Glu  
 915 920 925

ggt aca acg aca act aca aca aca aca acc gtt gcc gat ccg aag 2832  
 Gly Thr Thr Thr Thr Thr Thr Thr Thr Thr Thr Val Ala Asp Pro Lys  
 930 935 940

gca acg gaa tgc aaa tcc tta cag aca aca gac aca tgg gtt aca cag 2880  
 Ala Thr Glu Cys Lys Ser Leu Gln Thr Thr Asp Thr Trp Val Thr Gln  
 945 950 955 960

aca tcg aca cac aca agc acg tct act atc aca tct acc atc aca tca 2928  
 Thr Ser Thr His Thr Ser Thr Ser Thr Ile Thr Ser Thr Ile Thr Ser  
 965 970 975

aaa ata aca ttg aca tca acg agg cga tgc aaa cca acc aag tgt acg 2976  
 Lys Ile Thr Leu Thr Ser Thr Arg Arg Cys Lys Pro Thr Lys Cys Thr  
 980 985 990

aca ggg gat gat gca gaa gac gtg aag cca agt gaa ggc ttg agg gtg 3024  
 Thr Gly Asp Asp Ala Glu Asp Val Lys Pro Ser Glu Gly Leu Arg Val  
 995 1000 1005

agc ggg tgg aat gtg atg agg ggg gtg ata gta gca atg gtt att tcg 3072  
 Ser Gly Trp Asn Val Met Arg Gly Val Ile Val Ala Met Val Ile Ser  
 1010 1015 1020

ttc atg att tag 3084  
 Phe Met Ile  
 1025

&lt;210&gt; 8

&lt;211&gt; 1027

&lt;212&gt; PRT

<213> *Pneumocystis carinii* sp. f. *hominis*

&lt;400&gt; 8

Met Ala Arg Ala Val Lys Arg Gln Ala Lys Gly Ala Gln Asn Ser Ile  
 1 5 10 15

Asp Glu Glu His Val Leu Ala Leu Ile Leu Lys Lys Asn Gly Leu Glu  
 20 25 30

Asp Thr Lys Cys Lys Thr Lys Leu Glu Glu Tyr Cys Lys Thr Leu Thr  
 35 40 45

Asn Ala Gly Leu Asn Pro Glu Lys Val His Glu Lys Leu Lys Asp Phe  
 50 55 60

Cys Asp Asn Gly Lys Arg Asn Glu Lys Cys Gln Asp Leu Lys Asn Lys  
 65 70 75 80

Val Asn Gln Lys Cys Ile Lys Phe Gln Gly Lys Leu Gln Thr Ala Ala  
 85 90 95

28

Arg	Lys	Lys	Ile	Ser	Glu	Leu	Thr	Asp	Glu	Asp	Cys	Lys	Lys	Asn	Glu		
			100					105						110			
Gln	Gln	Cys	Leu	Phe	Leu	Glu	Gly	Ala	Cys	Pro	Thr	Glu	Leu	Lys	Asp		
		115					120					125					
Asp	Cys	Asn	Lys	Leu	Arg	Asn	Asn	Cys	Tyr	Gln	Lys	Glu	Arg	Asn	Asn		
	130					135					140						
Val	Ala	Glu	Glu	Val	Leu	Leu	Arg	Ala	Leu	Arg	Gly	Asp	Leu	Asn	Glu		
145					150					155					160		
Thr	Lys	Thr	Cys	Glu	Lys	Lys	Leu	Lys	Glu	Val	Cys	Pro	Lys	Leu	Glu		
			165						170					175			
Arg	Glu	Ser	Asp	Glu	Leu	Thr	Glu	Leu	Cys	Leu	Tyr	Gln	Lys	Thr	Thr		
			180					185					190				
Cys	Val	Ser	Leu	Val	Thr	Lys	Gly	Lys	Ser	Lys	Cys	Asp	Thr	Leu	Glu		
		195					200					205					
Lys	Glu	Val	Glu	Glu	Ala	Leu	Lys	Lys	Asn	Glu	Leu	Arg	Glu	Lys	Cys		
	210					215					220						
Leu	Leu	Leu	Leu	Glu	Gln	Cys	Tyr	Phe	His	Arg	Gly	Asn	Cys	Glu	Gly		
225					230					235					240		
Asp	Lys	Ser	Lys	Cys	Asn	Lys	Pro	Asn	Asn	Lys	Asp	Cys	Lys	Glu	Tyr		
				245				250						255			
Val	Pro	Glu	Cys	Asp	Glu	Leu	Ala	Glu	Lys	Cys	Gly	Lys	Glu	Asn	Ile		
			260					265					270				
Val	Tyr	Met	His	Pro	Gly	Ser	Asp	Phe	Asp	Pro	Thr	Lys	Pro	Glu	Pro		
		275					280					285					
Thr	Leu	Ala	Glu	Asp	Ile	Gly	Leu	Glu	Glu	Leu	Tyr	Lys	Arg	Ala	Glu		
	290					295					300						
Glu	Asp	Gly	Ile	Phe	Val	Gly	Arg	Gln	His	Val	Arg	Asp	Ala	Thr	Ala		
305					310					315					320		
Leu	Leu	Ala	Leu	Leu	Leu	Lys	Lys	Thr	Leu	Lys	Lys	Glu	Glu	Cys	Ile		
			325						330					335			
Lys	Ala	Leu	Lys	Lys	Asn	Cys	Glu	Asn	Pro	His	Glu	His	Glu	Ala	Leu		
		340						345					350				
Glu	Asn	Leu	Cys	Lys	Glu	Asn	Lys	Pro	Ser	Ser	Asp	Gly	Thr	Lys	Lys		
		355					360					365					
Cys	Asp	Glu	Leu	Glu	Lys	Asp	Val	Asn	Lys	Thr	Cys	Thr	Ser	Leu	Thr		
	370					375					380						
Ser	Thr	Ile	Leu	Lys	Asn	Arg	Leu	Tyr	Ile	Ser	Pro	Asp	Gly	Ile	Ala		
385					390					395					400		
Glu	Trp	Gly	Lys	Leu	Pro	Thr	Phe	Leu	Ser	Asp	Glu	Asp	Cys	Ala	Lys		
				405					410					415			

Leu Glu Ser Tyr Cys Phe Tyr Tyr Lys Glu Thr Cys Pro Asp Val Lys  
 420 425 430  
 Glu Ala Cys Met Asn Val Arg Ala Ala Cys Tyr Lys Arg Gly Leu Asp  
 435 440 445  
 Ala Arg Ala Asn Ser Val Leu Gln Lys Asn Met Arg Gly Leu Leu Arg  
 450 455 460  
 Gly Ser Asn Gln Ser Trp Leu Lys Glu Phe Gln Gln Arg Leu Val Lys  
 465 470 475 480  
 Val Cys Lys Glu Leu Lys Glu Asn Lys Gly Ser Phe Pro Asn Asp Glu  
 485 490 495  
 Ile Phe Val Leu Cys Val Gln Pro Ala Lys Ala Ala Arg Leu Leu Thr  
 500 505 510  
 His Asp His Gln Met Arg Val Thr Phe Leu Arg Gln Gln Leu Asp Gln  
 515 520 525  
 Lys Arg Asp Phe Pro Thr Asp Lys Asp Cys Lys Glu Leu Gly Lys Lys  
 530 535 540  
 Cys Gln Asp Leu Gly Lys Asp Ser Lys Glu Ile Thr Trp Pro Cys His  
 545 550 555 560  
 Thr Leu Glu Gln Gln Cys Asn Arg Leu Gly Thr Thr Glu Ile Leu Lys  
 565 570 575  
 Gln Val Leu Leu Asp Glu His Lys Asp Thr Leu Lys Asp Gln Glu Ser  
 580 585 590  
 Cys Val Lys Tyr Leu Lys Glu Lys Cys Asn Lys Trp Ser Arg Arg Gly  
 595 600 605  
 Asp Asp Arg Phe Ser Phe Val Cys Val Phe Gln Asn Ala Thr Cys Glu  
 610 615 620  
 Leu Met Val Lys Asp Val Lys Asp Arg Cys Glu Val Phe Lys Lys Asn  
 625 630 635 640  
 Ile Lys Ala Ser Tyr Ile Ile Glu Phe Leu Glu Asn Asn Thr Asn Lys  
 645 650 655  
 Ile Thr Thr Leu Glu Arg Asn Cys Pro Ser Trp His Thr Tyr Cys Asn  
 660 665 670  
 Arg Phe Ser Pro Asn Cys Pro Gly Leu Thr Lys Glu Asn Ser Cys Thr  
 675 680 685  
 Lys Ile Lys Lys His Cys Glu Pro Phe Tyr Lys Arg Lys Ala Leu Glu  
 690 695 700  
 Asp Ala Leu Lys Val Glu Leu Gln Gly Lys Leu Thr Asp Lys Ser Lys  
 705 710 715 720  
 Cys Glu Pro Ala Leu Asn Arg Tyr Cys Thr Val Ala Gly Asn Val Asn  
 725 730 735  
 Asn Ala Ser Ile Ser Gly Leu Cys Lys Ala Asn Thr Lys Asp Asn Ser  
 30

740	745	750
Gly Lys Ser Asp Glu Asp Ala Arg Lys Glu Leu Cys Glu Lys Ser Val 755	760	765
Lys Glu Val Glu Glu Gln Cys Lys Ala Leu Pro Thr Glu Leu Gly Gln 770	775	780
Pro Ala Ala Asp Leu Lys Lys Asp Tyr Lys Thr Tyr Glu Glu Leu Lys 785	790	800
Lys Arg Ala Glu Glu Ala Met Asn Lys Ser Ser Leu Val Leu Ser Leu 805	810	815
Ile Lys Lys Asn Glu Ser Asn Val Ser Lys Ser Asn Ser Lys Asn Lys 820	825	830
Asp Lys Asn Ala Val Ser Asn Gly Leu Gln Asp Thr Thr Lys His Val 835	840	845
Lys Ile Leu Arg Arg Gly Val Lys Asp Val Ser Val Thr Glu Leu Glu 850	855	860
Ala Lys Ala Phe Asp Leu Ala Ala Glu Val Phe Gly Arg Tyr Val Asp 865	870	875
Leu Lys Glu Arg Cys Asn Lys Leu Glu Ser Asp Cys Arg Ile Lys Glu 885	890	895
Asp Cys Lys Asp Leu Glu Glu Val Cys Lys Lys Ile Asn Lys Ala Cys 900	905	910
Arg Asn Leu Lys Pro Leu Glu Val Lys Pro His Glu Thr Val Thr Glu 915	920	925
Gly Thr Thr Thr Thr Thr Thr Thr Thr Thr Thr Thr Val Ala Asp Pro Lys 930	935	940
Ala Thr Glu Cys Lys Ser Leu Gln Thr Thr Asp Thr Trp Val Thr Gln 945	950	955
Thr Ser Thr His Thr Ser Thr Ser Thr Ile Thr Ser Thr Ile Thr Ser 965	970	975
Lys Ile Thr Leu Thr Ser Thr Arg Arg Cys Lys Pro Thr Lys Cys Thr 980	985	990
Thr Gly Asp Asp Ala Glu Asp Val Lys Pro Ser Glu Gly Leu Arg Val 995	1000	1005
Ser Gly Trp Asn Val Met Arg Gly Val Ile Val Ala Met Val Ile Ser 1010	1015	1020
Phe Met Ile 025		

<210> 9  
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 <212> DNA  
 <213> Pneumocystis carinii sp. f. hominis

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (1)..(3030)

&lt;400&gt; 9

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Met Ala Arg Ala Val Lys Arg Gln Ala Ala Lys Ala Ser Gly Ala Ser	
1 5 10 15	
gta tat gat ggt gaa gaa att ctt ttg gct tta att gca gga aaa aaa	96
Val Tyr Asp Gly Glu Glu Ile Leu Leu Ala Leu Ile Ala Gly Lys Lys	
20 25 30	
tat aat gat aat gaa tgc aaa aaa gaa tta gaa aaa tat tgt aag aca	144
Tyr Asn Asp Asn Glu Cys Lys Lys Glu Leu Glu Lys Tyr Cys Lys Thr	
35 40 45	
tta acg gat gca gaa tta aaa cca gaa aaa gtt cac aaa aaa ctt aag	192
Leu Thr Asp Ala Glu Leu Lys Pro Glu Lys Val His Lys Lys Leu Lys	
50 55 60	
gag ttt tgt gaa aat aaa aaa gca gat tca aaa tgc aaa gaa ctg aaa	240
Glu Phe Cys Glu Asn Lys Lys Ala Asp Ser Lys Cys Lys Glu Leu Lys	
65 70 75 80	
gaa aaa ctc act caa aaa tgt act gca atc aaa gga aaa ctt aca gaa	288
Glu Lys Leu Thr Gln Lys Cys Thr Ala Ile Lys Gly Lys Leu Thr Glu	
85 90 95	
gca atc aaa aaa aaa aat tca gat tta acg gat gaa gat tgc aaa gag	336
Ala Ile Lys Lys Lys Asn Ser Asp Leu Thr Asp Glu Asp Cys Lys Glu	
100 105 110	
aat gaa caa caa tgc cta ttt ttg gag gga gca tgt cca gcg gaa ctt	384
Asn Glu Gln Gln Cys Leu Phe Leu Glu Gly Ala Cys Pro Ala Glu Leu	
115 120 125	
aaa gat gat tgc aat act ttg aga aat aag tgc tat caa aag aag cgt	432
Lys Asp Asp Cys Asn Thr Leu Arg Asn Lys Cys Tyr Gln Lys Lys Arg	
130 135 140	
gat aaa gtg gcg gaa gaa gct ctt tta aga gca gtt cgt gga ggt cta	480
Asp Lys Val Ala Glu Glu Ala Leu Leu Arg Ala Val Arg Gly Gly Leu	
145 150 155 160	
atc aat gaa act aca tgt gaa gga aag ctc aaa gag gtt tgc ata gag	528
Ile Asn Glu Thr Thr Cys Glu Gly Lys Leu Lys Glu Val Cys Ile Glu	
165 170 175	
ttg agt caa gaa agt gat gag tta acg aag ctt tgt ctt tat caa aaa	576
Leu Ser Gln Glu Ser Asp Glu Leu Thr Lys Leu Cys Leu Tyr Gln Lys	
180 185 190	
atg acg tgc aaa aca ttt gta tta gaa aaa caa aaa aaa tgt aat gct	624
Met Thr Cys Lys Thr Phe Val Leu Glu Lys Gln Lys Lys Cys Asn Ala	
195 200 205	
ctt aaa cag gat gtt aac gca gca ctt gag aag aaa gat gag tta cga	672
Leu Lys Gln Asp Val Asn Ala Ala Leu Glu Lys Lys Asp Glu Leu Arg	
210 215 220	



gga aaa tgt tta cca ctg ctt gaa cga tgc tat ttt tat aga ggg aat	720
Gly Lys Cys Leu Pro Leu Leu Glu Arg Cys Tyr Phe Tyr Arg Gly Asn	
225 230 235 240	
tgt gaa gat ata tca aaa tgt aat aaa tca tcc gaa gac tgt tat gaa	768
Cys Glu Asp Ile Ser Lys Cys Asn Lys Ser Ser Glu Asp Cys Tyr Glu	
245 250 255	
tat ttg cca gtg tgt gat aca ttg gca gtg aaa tgt gaa gaa aat aag	816
Tyr Leu Pro Val Cys Asp Thr Leu Ala Val Lys Cys Glu Glu Asn Lys	
260 265 270	
att att tat aca cat ccg gga tcc gat ttc aat cca act aag tca aag	864
Ile Ile Tyr Thr His Pro Gly Ser Asp Phe Asn Pro Thr Lys Ser Lys	
275 280 285	
cct act gta gca gaa gac ata gga ctg gaa gag ctt tat aaa aag gcc	912
Pro Thr Val Ala Glu Asp Ile Gly Leu Glu Glu Leu Tyr Lys Lys Ala	
290 295 300	
gca gaa gaa ggt gtt cat att gga aag cct cct gta aga gat gca act	960
Ala Glu Glu Gly Val His Ile Gly Lys Pro Pro Val Arg Asp Ala Thr	
305 310 315 320	
gct cta ctg gcg ctt ttg att caa aat cta gat cct aag agt caa gtg	1008
Ala Leu Leu Ala Leu Leu Ile Gln Asn Leu Asp Pro Lys Ser Gln Val	
325 330 335	
ggt aaa gaa tgc gaa aaa gtt ctt aaa gat aac tgt aaa gag tta aaa	1056
Gly Lys Glu Cys Glu Lys Val Leu Lys Asp Asn Cys Lys Glu Leu Lys	
340 345 350	
agt cat gaa att ttg gga gat ttt tgt aat caa aat gta gct ggt caa	1104
Ser His Glu Ile Leu Gly Asp Phe Cys Asn Gln Asn Val Ala Gly Gln	
355 360 365	
aat gaa att gaa aag tgt aaa gag tta gag aag gag tta gca aac agt	1152
Asn Glu Ile Glu Lys Cys Lys Glu Leu Glu Lys Glu Leu Ala Asn Ser	
370 375 380	
act aaa att ctt ttt gaa aaa ata aag aat aaa cac ctc tct gga tcc	1200
Thr Lys Ile Leu Phe Glu Lys Ile Lys Asn Lys His Leu Ser Gly Ser	
385 390 395 400	
gga gaa gtc att cca tgg tat aag ttg acg aca ttt ctt agt gac aat	1248
Gly Glu Val Ile Pro Trp Tyr Lys Leu Thr Thr Phe Leu Ser Asp Asn	
405 410 415	
gac tgc aca agg tta gag tca gac tgt ttt tat tta aaa agt caa gca	1296
Asp Cys Thr Arg Leu Glu Ser Asp Cys Phe Tyr Leu Lys Ser Gln Ala	
420 425 430	
cct ctt gac aaa gaa tgt aat aat ctg aag gca gca tgt tat aag aga	1344
Pro Leu Asp Lys Glu Cys Asn Asn Leu Lys Ala Ala Cys Tyr Lys Arg	
435 440 445	
ggg ctt gaa gca caa gct aat gaa gca ttg cag aaa aag atg tac gga	1392
Gly Leu Glu Ala Gln Ala Asn Glu Ala Leu Gln Lys Lys Met Tyr Gly	
450 455 460	

ctg ttc tat ggt tca ggc aaa gaa tgg ttt aag aaa cta cta gaa aaa	1440
Leu Phe Tyr Gly Ser Gly Lys Glu Trp Phe Lys Lys Leu Leu Glu Lys	
465 470 475 480	
ata atg gaa gaa tgt tcg gaa ctt aaa aca aca agc gat gag ttg ttt	1488
Ile Met Glu Glu Cys Ser Glu Leu Lys Thr Thr Ser Asp Glu Leu Phe	
485 490 495	
ttg cta tgt att gat cca ctt aaa gca gtc aga ata ctt gca gct gat	1536
Leu Leu Cys Ile Asp Pro Leu Lys Ala Val Arg Ile Leu Ala Ala Asp	
500 505 510	
atc caa gca aga gca gtc ttt ttg cgg aaa caa ttg gat caa aag cga	1584
Ile Gln Ala Arg Ala Val Phe Leu Arg Lys Gln Leu Asp Gln Lys Arg	
515 520 525	
gac ttt cca aca gac aaa gat tgc aag gaa tta gga aga aag tgt gaa	1632
Asp Phe Pro Thr Asp Lys Asp Cys Lys Glu Leu Gly Arg Lys Cys Glu	
530 535 540	
gct tta ggg aag gat tca aat cag att aag tgg cca tgt cat acg cta	1680
Ala Leu Gly Lys Asp Ser Asn Gln Ile Lys Trp Pro Cys His Thr Leu	
545 550 555 560	
aaa caa cag tgt gat cgc ttg ggg act aca gaa atc ttg aaa cag gtt	1728
Lys Gln Gln Cys Asp Arg Leu Gly Thr Thr Glu Ile Leu Lys Gln Val	
565 570 575	
tta cta gat gaa cac aag gat act tta aga act cat gaa aac tgt acg	1776
Leu Leu Asp Glu His Lys Asp Thr Leu Arg Thr His Glu Asn Cys Thr	
580 585 590	
aaa tat tta aag aga aaa tgt cat aaa tgg tct aga agg ggt gat gat	1824
Lys Tyr Leu Lys Arg Lys Cys His Lys Trp Ser Arg Arg Gly Asp Asp	
595 600 605	
cgt ttc tct ttt gta tgt gtt tac caa aac gct acg tgt aag ctg ata	1872
Arg Phe Ser Phe Val Cys Val Tyr Gln Asn Ala Thr Cys Lys Leu Ile	
610 615 620	
gta gat gat gtg aaa gac agg tgt gaa gta ttt gaa aaa aat atg caa	1920
Val Asp Asp Val Lys Asp Arg Cys Glu Val Phe Glu Lys Asn Met Gln	
625 630 635 640	
gcg tca gat att aat aat tct ctt aaa aat aaa caa ata aaa aca gaa	1968
Ala Ser Asp Ile Asn Asn Ser Leu Lys Asn Lys Gln Ile Lys Thr Glu	
645 650 655	
tca gca gca aat att tgt ccc tca tgg cac cca tac tgc gat aga ttt	2016
Ser Ala Ala Asn Ile Cys Pro Ser Trp His Pro Tyr Cys Asp Arg Phe	
660 665 670	
tta ccc aat tgt cct gat ctt aag aaa gga aaa act ttc tgt caa aat	2064
Leu Pro Asn Cys Pro Asp Leu Lys Lys Gly Lys Thr Phe Cys Gln Asn	
675 680 685	
ctt aaa aaa tat tgc gaa cca ttc tac aaa agg aag gtt tta gaa gat	2112
Leu Lys Lys Tyr Cys Glu Pro Phe Tyr Lys Arg Lys Val Leu Glu Asp	
690 695 700	
gct ctt aaa gta gag ctt caa ggg aat tta agt aat aga aat aaa tgt	2160

Ala Leu Lys Val Glu Leu Gln Gly Asn Leu Ser Asn Arg Asn Lys Cys 705 710 715 720	
gaa tct gca tta gaa aga tat tgc aca ata ttg aaa aat gta agt gat Glu Ser Ala Leu Glu Arg Tyr Cys Thr Ile Leu Lys Asn Val Ser Asp 725 730 735	2208
tca tca atc aac agt tta tgt aaa gat aat acc gaa agt aaa act aaa Ser Ser Ile Asn Ser Leu Cys Lys Asp Asn Thr Glu Ser Lys Thr Lys 740 745 750	2256
aag acc gat aat gaa gtt aga aag aag ctt tgt cta aaa tta gtg gaa Lys Thr Asp Asn Glu Val Arg Lys Lys Leu Cys Leu Lys Leu Val Glu 755 760 765	2304
gag gtg gaa cag caa tgt aaa atg tta cca gca gaa ttg gag cat gag Glu Val Glu Gln Gln Cys Lys Met Leu Pro Ala Glu Leu Glu His Glu 770 775 780	2352
gaa aaa gac cta aaa gat gat ttt gaa aca ttt gaa aaa ctt aaa aaa Glu Lys Asp Leu Lys Asp Asp Phe Glu Thr Phe Glu Lys Leu Lys Lys 785 790 795 800	2400
cag gca gag aaa aca atg aat aaa tcc aat ctt gtt tta tca ttc gtt Gln Ala Glu Lys Thr Met Asn Lys Ser Asn Leu Val Leu Ser Phe Val 805 810 815	2448
aag aaa gat gaa aat aat aca tcg aaa aat agt agc aaa gac aag gat Lys Lys Asp Glu Asn Asn Thr Ser Lys Asn Ser Ser Lys Asp Lys Asp 820 825 830	2496
aag aat acc gtt tca aac gga ctt caa gat acc aca gaa cat atg aaa Lys Asn Thr Val Ser Asn Gly Leu Gln Asp Thr Thr Glu His Met Lys 835 840 845	2544
ata cta cgg aga gga gtt aag gat gta tcc gta aca gaa tct gaa gct Ile Leu Arg Arg Gly Val Lys Asp Val Ser Val Thr Glu Ser Glu Ala 850 855 860	2592
aag gca ttt gat ttg gta gca gaa gta ttt gga aga tat cta gac ttg Lys Ala Phe Asp Leu Val Ala Glu Val Phe Gly Arg Tyr Leu Asp Leu 865 870 875 880	2640
aaa gaa aga tgt aat aaa ttg gaa tca gat tgc aga gtt aag gag gat Lys Glu Arg Cys Asn Lys Leu Glu Ser Asp Cys Arg Val Lys Glu Asp 885 890 895	2688
tgc aag gat tta gaa gga gta tgt gga aag ata caa gga gta tgt tcg Cys Lys Asp Leu Glu Gly Val Cys Gly Lys Ile Gln Gly Val Cys Ser 900 905 910	2736
aaa tta aaa cca ctg aaa gtg aag ccg cac gaa aca gtg aca gaa agc Lys Leu Lys Pro Leu Lys Val Lys Pro His Glu Thr Val Thr Glu Ser 915 920 925	2784
aca acg acg acc acg acg aca aca acg acc gtt act gat ccg aag gca Thr Thr Thr Thr Thr Thr Thr Thr Thr Thr Val Thr Asp Pro Lys Ala 930 935 940	2832
aca gaa tgc aaa tct tta cag aca aca gat aca tgg att aca cag act Thr Glu Cys Lys Ser Leu Gln Thr Thr Asp Thr Trp Ile Thr Gln Thr 945 950 955 960	2880

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945          950          955          960
tcg aca cat acc agc acg tct acc atc aca tct aca atc aca tca aaa 2928
Ser Thr His Thr Ser Thr Ser Thr Ile Thr Ser Thr Ile Thr Ser Lys
          965          970          975

ata aca ctc aca tca aca agg cgt tgc aaa cca acc aag tgt acg aca 2976
Ile Thr Leu Thr Ser Thr Arg Arg Cys Lys Pro Thr Lys Cys Thr Thr
          980          985          990

ggg gat gat gca gag gac gtg aag ccg agt gag gga ttg aag atg agt 3024
Gly Asp Asp Ala Glu Asp Val Lys Pro Ser Glu Gly Leu Lys Met Ser
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Tyr Asn Asp Asn Glu Cys Lys Lys Glu Leu Glu Lys Tyr Cys Lys Thr
          35          40          45

Leu Thr Asp Ala Glu Leu Lys Pro Glu Lys Val His Lys Lys Leu Lys
          50          55          60

Glu Phe Cys Glu Asn Lys Lys Ala Asp Ser Lys Cys Lys Glu Leu Lys
          65          70          75          80

Glu Lys Leu Thr Gln Lys Cys Thr Ala Ile Lys Gly Lys Leu Thr Glu
          85          90          95

Ala Ile Lys Lys Lys Asn Ser Asp Leu Thr Asp Glu Asp Cys Lys Glu
          100          105          110

Asn Glu Gln Gln Cys Leu Phe Leu Glu Gly Ala Cys Pro Ala Glu Leu
          115          120          125

Lys Asp Asp Cys Asn Thr Leu Arg Asn Lys Cys Tyr Gln Lys Lys Arg
          130          135          140

Asp Lys Val Ala Glu Glu Ala Leu Leu Arg Ala Val Arg Gly Gly Leu
          145          150          155          160

Ile Asn Glu Thr Thr Cys Glu Gly Lys Leu Lys Glu Val Cys Ile Glu
          165          170          175

Leu Ser Gln Glu Ser Asp Glu Leu Thr Lys Leu Cys Leu Tyr Gln Lys
          180          185          190

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Met Thr Cys Lys Thr Phe Val Leu Glu Lys Gln Lys Lys Cys Asn Ala  
 195 200 205  
 Leu Lys Gln Asp Val Asn Ala Ala Leu Glu Lys Lys Asp Glu Leu Arg  
 210 215 220  
 Gly Lys Cys Leu Pro Leu Leu Glu Arg Cys Tyr Phe Tyr Arg Gly Asn  
 225 230 235 240  
 Cys Glu Asp Ile Ser Lys Cys Asn Lys Ser Ser Glu Asp Cys Tyr Glu  
 245 250 255  
 Tyr Leu Pro Val Cys Asp Thr Leu Ala Val Lys Cys Glu Glu Asn Lys  
 260 265 270  
 Ile Ile Tyr Thr His Pro Gly Ser Asp Phe Asn Pro Thr Lys Ser Lys  
 275 280 285  
 Pro Thr Val Ala Glu Asp Ile Gly Leu Glu Glu Leu Tyr Lys Lys Ala  
 290 295 300  
 Ala Glu Glu Gly Val His Ile Gly Lys Pro Pro Val Arg Asp Ala Thr  
 305 310 315 320  
 Ala Leu Leu Ala Leu Leu Ile Gln Asn Leu Asp Pro Lys Ser Gln Val  
 325 330 335  
 Gly Lys Glu Cys Glu Lys Val Leu Lys Asp Asn Cys Lys Glu Leu Lys  
 340 345 350  
 Ser His Glu Ile Leu Gly Asp Phe Cys Asn Gln Asn Val Ala Gly Gln  
 355 360 365  
 Asn Glu Ile Glu Lys Cys Lys Glu Leu Glu Lys Glu Leu Ala Asn Ser  
 370 375 380  
 Thr Lys Ile Leu Phe Glu Lys Ile Lys Asn Lys His Leu Ser Gly Ser  
 385 390 395 400  
 Gly Glu Val Ile Pro Trp Tyr Lys Leu Thr Thr Phe Leu Ser Asp Asn  
 405 410 415  
 Asp Cys Thr Arg Leu Glu Ser Asp Cys Phe Tyr Leu Lys Ser Gln Ala  
 420 425 430  
 Pro Leu Asp Lys Glu Cys Asn Asn Leu Lys Ala Ala Cys Tyr Lys Arg  
 435 440 445  
 Gly Leu Glu Ala Gln Ala Asn Glu Ala Leu Gln Lys Lys Met Tyr Gly  
 450 455 460  
 Leu Phe Tyr Gly Ser Gly Lys Glu Trp Phe Lys Lys Leu Leu Glu Lys  
 465 470 475 480  
 Ile Met Glu Glu Cys Ser Glu Leu Lys Thr Thr Ser Asp Glu Leu Phe  
 485 490 495  
 Leu Leu Cys Ile Asp Pro Leu Lys Ala Val Arg Ile Leu Ala Ala Asp  
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 Ile Gln Ala Arg Ala Val Phe Leu Arg Lys Gln Leu Asp Gln Lys Arg

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Ala	Leu	Gly	Lys	Asp	Ser	Asn	Gln	Ile	Lys	Trp	Pro	Cys	His	Thr	Leu
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Lys	Gln	Gln	Cys	Asp	Arg	Leu	Gly	Thr	Thr	Glu	Ile	Leu	Lys	Gln	Val
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			580					585					590		
Lys	Tyr	Leu	Lys	Arg	Lys	Cys	His	Lys	Trp	Ser	Arg	Arg	Gly	Asp	Asp
	595					600						605			
Arg	Phe	Ser	Phe	Val	Cys	Val	Tyr	Gln	Asn	Ala	Thr	Cys	Lys	Leu	Ile
	610					615					620				
Val	Asp	Asp	Val	Lys	Asp	Arg	Cys	Glu	Val	Phe	Glu	Lys	Asn	Met	Gln
625					630					635					640
Ala	Ser	Asp	Ile	Asn	Asn	Ser	Leu	Lys	Asn	Lys	Gln	Ile	Lys	Thr	Glu
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Ser	Ala	Ala	Asn	Ile	Cys	Pro	Ser	Trp	His	Pro	Tyr	Cys	Asp	Arg	Phe
			660					665					670		
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		675				680						685			
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Glu	Ser	Ala	Leu	Glu	Arg	Tyr	Cys	Thr	Ile	Leu	Lys	Asn	Val	Ser	Asp
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Ser	Ser	Ile	Asn	Ser	Leu	Cys	Lys	Asp	Asn	Thr	Glu	Ser	Lys	Thr	Lys
			740					745					750		
Lys	Thr	Asp	Asn	Glu	Val	Arg	Lys	Lys	Leu	Cys	Leu	Lys	Leu	Val	Glu
		755					760					765			
Glu	Val	Glu	Gln	Gln	Cys	Lys	Met	Leu	Pro	Ala	Glu	Leu	Glu	His	Glu
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Gln	Ala	Glu	Lys	Thr	Met	Asn	Lys	Ser	Asn	Leu	Val	Leu	Ser	Phe	Val
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Lys Ala Phe Asp Leu Val Ala Glu Val Phe Gly Arg Tyr Leu Asp Leu  
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Lys Glu Arg Cys Asn Lys Leu Glu Ser Asp Cys Arg Val Lys Glu Asp  
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Cys Lys Asp Leu Glu Gly Val Cys Gly Lys Ile Gln Gly Val Cys Ser  
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Lys Leu Lys Pro Leu Lys Val Lys Pro His Glu Thr Val Thr Glu Ser  
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Thr Thr Thr Thr Thr Thr Thr Thr Thr Thr Val Thr Asp Pro Lys Ala  
 930 935 940

Thr Glu Cys Lys Ser Leu Gln Thr Thr Asp Thr Trp Ile Thr Gln Thr  
 945 950 955 960

Ser Thr His Thr Ser Thr Ser Thr Ile Thr Ser Thr Ile Thr Ser Lys  
 965 970 975

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Gly

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gat gaa gtg aat att ttg gcg ttg att cta caa gaa gat gca atg gaa 96  
 Asp Glu Val Asn Ile Leu Ala Leu Ile Leu Gln Glu Asp Ala Met Glu  
 20 25 30

gat aca aaa tgc aaa aaa agt tta gaa aaa tac tgc gaa gag ttg aaa 144  
 Asp Thr Lys Cys Lys Lys Ser Leu Glu Lys Tyr Cys Glu Glu Leu Lys  
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aaa gca tca cta gac atg gaa aaa gta cat aaa atg ctt aaa gat ttc 192  
 Lys Ala Ser Leu Asp Met Glu Lys Val His Lys Met Leu Lys Asp Phe  
 50 55 60

tgt gga aat ggg aaa gca agt aaa gca aat aca aaa tgt caa ggt cta 240  
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Cys Gly Asn Gly Lys Ala Ser Lys Ala Asn Thr Lys Cys Gln Gly Leu	
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caa gcc aaa gtt acg ggg aaa tgt aca aat ttt aaa aca caa aag cta	288
Gln Ala Lys Val Thr Gly Lys Cys Thr Asn Phe Lys Thr Gln Lys Leu	
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gga cca gcg tta aca aat cca tca gat gat aat tgc aaa gag agt gaa	336
Gly Pro Ala Leu Thr Asn Pro Ser Asp Asp Asn Cys Lys Glu Ser Glu	
100 105 110	
cga caa tgc cta ttt ttg gag gga gca tgc cat aat ctt gta gaa gat	384
Arg Gln Cys Leu Phe Leu Glu Gly Ala Cys His Asn Leu Val Glu Asp	
115 120 125	
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Cys Asn Lys Leu Arg Asn Leu Cys Tyr Gln Lys Lys Arg Asp Gly Val	
130 135 140	
gca gaa gaa gtc ctt ttg agg gca ctt cgt agt gat ctc aat aaa aca	480
Ala Glu Glu Val Leu Leu Arg Ala Leu Arg Ser Asp Leu Asn Lys Thr	
145 150 155 160	
gaa aca cat gaa aaa aaa ctg aaa gag att tgc cca gtc ttg cag agg	528
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165 170 175	
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Glu Ser Asn Glu Leu Thr Asp Leu Cys Leu Asn Gln Lys Lys Thr Cys	
180 185 190	
gag aat att ata aaa gaa aaa gat aaa aaa tgc act act ctt aaa gca	624
Glu Asn Ile Ile Lys Glu Lys Asp Lys Lys Cys Thr Thr Leu Lys Ala	
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tta ctt gaa caa tgc tat ttt tac att gga aat tgc gga gac gac gat	720
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Val Tyr Ile Pro Pro Gly Pro Asp Phe Asp Pro Thr Arg Pro Glu Ala	
260 265 270	
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Thr Leu Ala Glu Asp Ile Asp Leu Asp Glu Leu Tyr Lys Lys Ala Glu	
275 280 285	
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Glu Asp Gly Val Phe Ile Gly Lys His His Leu Arg Asp Ala Thr Ala	
290 295 300	
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Leu Leu Thr Leu Leu Val Lys Lys Asp Asp Thr Gly Lys Asn Asn Asn	



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Ile Gly Glu Lys Cys Asn Lys Ile Leu Glu Asp Lys Cys Lys Asn Ser	325	330	335	
caa cag cat gaa gct cta aaa aat tta tgt aat aat aat agt cct aat				1056
Gln Gln His Glu Ala Leu Lys Asn Leu Cys Asn Asn Asn Ser Pro Asn	340	345	350	
gca tat gga aaa gaa aaa tgc aaa gaa tta gaa gaa gat att aaa aaa				1104
Ala Tyr Gly Lys Glu Lys Cys Lys Glu Leu Glu Glu Asp Ile Lys Lys	355	360	365	
aca tgc aca aac ctc aaa cca acg att ctt aaa aac cat ctt tat gat				1152
Thr Cys Thr Asn Leu Lys Pro Thr Ile Leu Lys Asn His Leu Tyr Asp	370	375	380	
cca aat gat aaa att gtt gag tgg aga aaa ctg cca aca ttt ctt act				1200
Pro Asn Asp Lys Ile Val Glu Trp Arg Lys Leu Pro Thr Phe Leu Thr	385	390	395	400
aat gaa gac tgt gca aga ttg gaa tct tat tgt ttt tac tac gaa aaa				1248
Asn Glu Asp Cys Ala Arg Leu Glu Ser Tyr Cys Phe Tyr Tyr Glu Lys	405	410	415	
gct tgt cca aat gcc aaa gaa gag tgt atg aat ttg agg gca gcg tgt				1296
Ala Cys Pro Asn Ala Lys Glu Glu Cys Met Asn Leu Arg Ala Ala Cys	420	425	430	
tat aag aga ggg ctt gat gga cgg gca aat aaa gtg ctg caa gaa aat				1344
Tyr Lys Arg Gly Leu Asp Gly Arg Ala Asn Lys Val Leu Gln Glu Asn	435	440	445	
atg cgt ggg tta tta cgt ggt tca aat caa agt tgg ctt aag gag ttt				1392
Met Arg Gly Leu Leu Arg Gly Ser Asn Gln Ser Trp Leu Lys Glu Phe	450	455	460	
caa caa aga tta gta aaa gta tgt aag gag cta aaa gaa aat aaa gga				1440
Gln Gln Arg Leu Val Lys Val Cys Lys Glu Leu Lys Glu Asn Lys Gly	465	470	475	480
agt ttc cca aac gat gaa ata ttt gtt ctg tgt gta cag cca gca aaa				1488
Ser Phe Pro Asn Asp Glu Ile Phe Val Leu Cys Val Gln Pro Ala Lys	485	490	495	
gct gca cga tta ctt aca cac gat cat caa atg agg gtt atc ttt tta				1536
Ala Ala Arg Leu Leu Thr His Asp His Gln Met Arg Val Ile Phe Leu	500	505	510	
cga caa caa ttg gat caa aag aga gat ttt ccg aca gat aaa gac tgc				1584
Arg Gln Gln Leu Asp Gln Lys Arg Asp Phe Pro Thr Asp Lys Asp Cys	515	520	525	
aag gaa tta ggg aaa aaa tgc caa gat tta gga aag gat tca aaa gaa				1632
Lys Glu Leu Gly Lys Lys Cys Gln Asp Leu Gly Lys Asp Ser Lys Glu	530	535	540	
att aca tgg cca tgt cat acg ctg gag cag caa tgc aat cgc ttg ggg				1680
Ile Thr Trp Pro Cys His Thr Leu Glu Gln Gln Cys Asn Arg Leu Gly	545	550	555	560

act aca gaa att tta aag cag gtt tta ttg gat gaa cac aaa gat act	1728
Thr Thr Glu Ile Leu Lys Gln Val Leu Leu Asp Glu His Lys Asp Thr	
565 570 575	
ttg aaa gac caa gaa agt tgt gta aaa tac cta aaa gaa aag tgt aat	1776
Leu Lys Asp Gln Glu Ser Cys Val Lys Tyr Leu Lys Glu Lys Cys Asn	
580 585 590	
aaa tgg tct aga aga gga gat gac cgt ttc tct ttt gta tgt gtc ttc	1824
Lys Trp Ser Arg Arg Gly Asp Asp Arg Phe Ser Phe Val Cys Val Phe	
595 600 605	
caa aac gct acg tgt gag ctg atg gta aaa gac gtg aaa gac agg tgt	1872
Gln Asn Ala Thr Cys Glu Leu Met Val Lys Asp Val Lys Asp Arg Cys	
610 615 620	
gaa gta ttc aaa aaa aat ata aaa gct tca tat att att gaa ttt ctt	1920
Glu Val Phe Lys Lys Asn Ile Lys Ala Ser Tyr Ile Ile Glu Phe Leu	
625 630 635 640	
gaa aat aat aca aat aaa ata aca aca ctg gaa aga aat tgt ccc tct	1968
Glu Asn Asn Thr Asn Lys Ile Thr Thr Leu Glu Arg Asn Cys Pro Ser	
645 650 655	
tgg cat acg tat tgc aat aga ttt tca cct aat tgt cca ggt ctt acg	2016
Trp His Thr Tyr Cys Asn Arg Phe Ser Pro Asn Cys Pro Gly Leu Thr	
660 665 670	
aaa gag aat agt tgt aca aaa atc aag aag cat tgt gag ccg ttc tat	2064
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Leu Thr Asp Lys Ser Lys Cys Glu Pro Ala Leu Lys Arg Tyr Cys Thr	
705 710 715 720	
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Val Ala Gly Asn Val Asn Asn Ala Ser Ile Ser Gly Leu Cys Lys Ala	
725 730 735	
aac acc aag gat aac tct gga aag agt gat gag gat gct aga aag gaa	2256
Asn Thr Lys Asp Asn Ser Gly Lys Ser Asp Glu Asp Ala Arg Lys Glu	
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ctc tgt gag aaa tta gtg aaa gaa gtg gaa gaa cag tgc aaa gca tta	2304
Leu Cys Glu Lys Leu Val Lys Glu Val Glu Glu Gln Cys Lys Ala Leu	
755 760 765	
cca aca gaa tta gga caa ccg gca gct gat tta aaa aaa gat tat aag	2352
Pro Thr Glu Leu Gly Gln Pro Ala Ala Asp Leu Lys Lys Asp Tyr Lys	
770 775 780	
aca tat gag gaa ctt aag aaa cgt gca gag gaa gca atg aac aag tcc	2400
Thr Tyr Glu Glu Leu Lys Lys Arg Ala Glu Glu Ala Met Asn Lys Ser	
785 790 795 800	

agt ctt gtt ttg tca ctc att aag aaa aac gaa agt aat gta tca aaa	2448
Ser Leu Val Leu Ser Leu Ile Lys Lys Asn Glu Ser Asn Val Ser Lys	
805 810 815	
agt aat agc aaa aac aag gat aag aat gcc gtt tca aac gga ctt caa	2496
Ser Asn Ser Lys Asn Lys Asp Lys Asn Ala Val Ser Asn Gly Leu Gln	
820 825 830	
gat acc aca aaa cat gtg aaa ata cta cgg aga gga gtt aag gat gta	2544
Asp Thr Thr Lys His Val Lys Ile Leu Arg Arg Gly Val Lys Asp Val	
835 840 845	
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Ser Val Thr Glu Leu Glu Ala Lys Ala Phe Asp Leu Ala Ala Glu Val	
850 855 860	
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Phe Gly Arg Tyr Val Asp Leu Lys Glu Arg Cys Asn Lys Leu Glu Ser	
865 870 875 880	
gat tgc aga att aag gag gat tgc aaa gac tta gaa gaa gta tgc aaa	2688
Asp Cys Arg Ile Lys Glu Asp Cys Lys Asp Leu Glu Glu Val Cys Lys	
885 890 895	
aag att aat aag gct tgt cgc aat ctg aag cct ctg gag gtg aag ccg	2736
Lys Ile Asn Lys Ala Cys Arg Asn Leu Lys Pro Leu Glu Val Lys Pro	
900 905 910	
cac gaa aca gtg aca gaa agt aca acg aca act aca aca aca aca aca	2784
His Glu Thr Val Thr Glu Ser Thr Thr Thr Thr Thr Thr Thr Thr	
915 920 925	
acc gtt gcc gat ccg aag gca acg gaa tgc aaa tcc tta cag aca aca	2832
Thr Val Ala Asp Pro Lys Ala Thr Glu Cys Lys Ser Leu Gln Thr Thr	
930 935 940	
gac aca tgg gtt aca cag aca tcg aca cac aca agc acg tct act atc	2880
Asp Thr Trp Val Thr Gln Thr Ser Thr His Thr Ser Thr Ser Thr Ile	
945 950 955 960	
aca tct acc atc aca tca aaa ata aca ttg aca tca acg agg cga tgc	2928
Thr Ser Thr Ile Thr Ser Lys Ile Thr Leu Thr Ser Thr Arg Arg Cys	
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Lys Pro Thr Lys Cys Thr Thr Gly Asp Asp Ala Glu Asp Val Lys Pro	
980 985 990	
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Ser Glu Gly Leu Arg Val Ser Gly Trp Asn Val Met Arg Gly Val Ile	
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&lt;212&gt; PRT

<213> *Pneumocystis carinii* sp. f. *hominis*

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Cys Gly Asn Gly Lys Ala Ser Lys Ala Asn Thr Lys Cys Gln Gly Leu  
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Gln Ala Lys Val Thr Gly Lys Cys Thr Asn Phe Lys Thr Gln Lys Leu  
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Cys Asn Lys Leu Arg Asn Leu Cys Tyr Gln Lys Lys Arg Asp Gly Val  
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Glu Ser Asn Glu Leu Thr Asp Leu Cys Leu Asn Gln Lys Lys Thr Cys  
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Glu Asn Ile Ile Lys Glu Lys Asp Lys Lys Cys Thr Thr Leu Lys Ala  
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 210 215 220

Leu Leu Glu Gln Cys Tyr Phe Tyr Ile Gly Asn Cys Gly Asp Asp Asp  
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Ile Ile Lys Cys Ile Glu Leu Gly Gly Lys Cys Gln Glu Gln Asn Ile  
 245 250 255

Val Tyr Ile Pro Pro Gly Pro Asp Phe Asp Pro Thr Arg Pro Glu Ala  
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Thr Leu Ala Glu Asp Ile Asp Leu Asp Glu Leu Tyr Lys Lys Ala Glu  
 275 280 285

Glu Asp Gly Val Phe Ile Gly Lys His His Leu Arg Asp Ala Thr Ala  
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 Gln Gln His Glu Ala Leu Lys Asn Leu Cys Asn Asn Asn Ser Pro Asn  
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 Ala Tyr Gly Lys Glu Lys Cys Lys Glu Leu Glu Glu Asp Ile Lys Lys  
 355 360 365  
 Thr Cys Thr Asn Leu Lys Pro Thr Ile Leu Lys Asn His Leu Tyr Asp  
 370 375 380  
 Pro Asn Asp Lys Ile Val Glu Trp Arg Lys Leu Pro Thr Phe Leu Thr  
 385 390 395 400  
 Asn Glu Asp Cys Ala Arg Leu Glu Ser Tyr Cys Phe Tyr Tyr Glu Lys  
 405 410 415  
 Ala Cys Pro Asn Ala Lys Glu Glu Cys Met Asn Leu Arg Ala Ala Cys  
 420 425 430  
 Tyr Lys Arg Gly Leu Asp Gly Arg Ala Asn Lys Val Leu Gln Glu Asn  
 435 440 445  
 Met Arg Gly Leu Leu Arg Gly Ser Asn Gln Ser Trp Leu Lys Glu Phe  
 450 455 460  
 Gln Gln Arg Leu Val Lys Val Cys Lys Glu Leu Lys Glu Asn Lys Gly  
 465 470 475 480  
 Ser Phe Pro Asn Asp Glu Ile Phe Val Leu Cys Val Gln Pro Ala Lys  
 485 490 495  
 Ala Ala Arg Leu Leu Thr His Asp His Gln Met Arg Val Ile Phe Leu  
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 Arg Gln Gln Leu Asp Gln Lys Arg Asp Phe Pro Thr Asp Lys Asp Cys  
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 Lys Glu Leu Gly Lys Lys Cys Gln Asp Leu Gly Lys Asp Ser Lys Glu  
 530 535 540  
 Ile Thr Trp Pro Cys His Thr Leu Glu Gln Gln Cys Asn Arg Leu Gly  
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 580 585 590  
 Lys Trp Ser Arg Arg Gly Asp Asp Arg Phe Ser Phe Val Cys Val Phe  
 595 600 605  
 Gln Asn Ala Thr Cys Glu Leu Met Val Lys Asp Val Lys Asp Arg Cys  
 610 615 620  
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 625 630 635 640

Glu Asn Asn Thr Asn Lys Ile Thr Thr Leu Glu Arg Asn Cys Pro Ser  
 645 650 655  
 Trp His Thr Tyr Cys Asn Arg Phe Ser Pro Asn Cys Pro Gly Leu Thr  
 660 665 670  
 Lys Glu Asn Ser Cys Thr Lys Ile Lys Lys His Cys Glu Pro Phe Tyr  
 675 680 685  
 Lys Arg Lys Ala Leu Glu Asp Ala Leu Lys Val Glu Leu Gln Gly Lys  
 690 695 700  
 Leu Thr Asp Lys Ser Lys Cys Glu Pro Ala Leu Lys Arg Tyr Cys Thr  
 705 710 715 720  
 Val Ala Gly Asn Val Asn Asn Ala Ser Ile Ser Gly Leu Cys Lys Ala  
 725 730 735  
 Asn Thr Lys Asp Asn Ser Gly Lys Ser Asp Glu Asp Ala Arg Lys Glu  
 740 745 750  
 Leu Cys Glu Lys Leu Val Lys Glu Val Glu Glu Gln Cys Lys Ala Leu  
 755 760 765  
 Pro Thr Glu Leu Gly Gln Pro Ala Ala Asp Leu Lys Lys Asp Tyr Lys  
 770 775 780  
 Thr Tyr Glu Glu Leu Lys Lys Arg Ala Glu Glu Ala Met Asn Lys Ser  
 785 790 795 800  
 Ser Leu Val Leu Ser Leu Ile Lys Lys Asn Glu Ser Asn Val Ser Lys  
 805 810 815  
 Ser Asn Ser Lys Asn Lys Asp Lys Asn Ala Val Ser Asn Gly Leu Gln  
 820 825 830  
 Asp Thr Thr Lys His Val Lys Ile Leu Arg Arg Gly Val Lys Asp Val  
 835 840 845  
 Ser Val Thr Glu Leu Glu Ala Lys Ala Phe Asp Leu Ala Ala Glu Val  
 850 855 860  
 Phe Gly Arg Tyr Val Asp Leu Lys Glu Arg Cys Asn Lys Leu Glu Ser  
 865 870 875 880  
 Asp Cys Arg Ile Lys Glu Asp Cys Lys Asp Leu Glu Glu Val Cys Lys  
 885 890 895  
 Lys Ile Asn Lys Ala Cys Arg Asn Leu Lys Pro Leu Glu Val Lys Pro  
 900 905 910  
 His Glu Thr Val Thr Glu Ser Thr Thr Thr Thr Thr Thr Thr Thr  
 915 920 925  
 Thr Val Ala Asp Pro Lys Ala Thr Glu Cys Lys Ser Leu Gln Thr Thr  
 930 935 940  
 Asp Thr Trp Val Thr Gln Thr Ser Thr His Thr Ser Thr Ser Thr Ile  
 945 950 955 960  
 Thr Ser Thr Ile Thr Ser Lys Ile Thr Leu Thr Ser Thr Arg Arg Cys

965

970

975

Lys Pro Thr Lys Cys Thr Thr Gly Asp Asp Ala Glu Asp Val Lys Pro  
 980 985 990

Ser Glu Gly Leu Arg Val Ser Gly Trp Asn Val Met Arg Gly Val Ile  
 995 1000 1005

Val Ala Met Val Ile Ser Phe Met Ile  
 1010 1015

&lt;210&gt; 13

&lt;211&gt; 3072

&lt;212&gt; DNA

<213> *Pneumocystis carinii* sp. f. *hominis*

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (1)..(3072)

&lt;400&gt; 13

atg gcg cgg gcg gtc aag cgg cag gca gca ggg aca cag aat agc att 48  
 Met Ala Arg Ala Val Lys Arg Gln Ala Ala Gly Thr Gln Asn Ser Ile  
 1 5 10 15

gat gag gaa cat gtt tta gct tta att cta aag gaa gat gga cta agt 96  
 Asp Glu Glu His Val Leu Ala Leu Ile Leu Lys Glu Asp Gly Leu Ser  
 20 25 30

gag cag gaa tgc aaa aaa aaa cta aaa aaa tat tgc caa gaa ttg act 144  
 Glu Gln Glu Cys Lys Lys Lys Leu Lys Lys Tyr Cys Gln Glu Leu Thr  
 35 40 45

gaa gca aaa cta aat ata gaa caa gta cac aga aaa ctt aaa ggt ttt 192  
 Glu Ala Lys Leu Asn Ile Glu Gln Val His Arg Lys Leu Lys Gly Phe  
 50 55 60

tgc gaa gat gga aaa gca gat aca aaa tgc aaa gaa ctg aaa gcc aat 240  
 Cys Glu Asp Gly Lys Ala Asp Thr Lys Cys Lys Glu Leu Lys Ala Asn  
 65 70 75 80

att gag aaa aaa tgt act aca atc aaa gga aaa ctt aaa gaa gca att 288  
 Ile Glu Lys Lys Cys Thr Thr Ile Lys Gly Lys Leu Lys Glu Ala Ile  
 85 90 95

aaa aaa aaa att cag att ata acg gat aag gat tgc aaa gag aat gaa 336  
 Lys Lys Lys Ile Gln Ile Ile Thr Asp Lys Asp Cys Lys Glu Asn Glu  
 100 105 110

caa caa tgc cta ttt ttg gag gga gta tgt tca aaa gaa ctt aaa gat 384  
 Gln Gln Cys Leu Phe Leu Glu Gly Val Cys Ser Lys Glu Leu Lys Asp  
 115 120 125

gat tgc aat act ttg aga aat aag tgc tat caa aag aaa cgt gat aaa 432  
 Asp Cys Asn Thr Leu Arg Asn Lys Cys Tyr Gln Lys Lys Arg Asp Lys  
 130 135 140

gtt gcg gaa gaa gtt ctt tta aga gca ctt cgt agc gat ctt aat gga 480  
 Val Ala Glu Glu Val Leu Leu Arg Ala Leu Arg Ser Asp Leu Asn Gly  
 145 150 155 160

tca gtc ata tgt gaa aaa aaa ctt aaa gag att tgc cct gtc atg ggg	528
Ser Val Ile Cys Glu Lys Lys Leu Lys Glu Ile Cys Pro Val Met Gly	
165 170 175	
agg gaa agt gat gag tta aca aac ttg tgt ctg aac cag aaa gag aca	576
Arg Glu Ser Asp Glu Leu Thr Asn Leu Cys Leu Asn Gln Lys Glu Thr	
180 185 190	
tgt aag aat att tta att gaa aaa gat aag aag tgc ggt act ctt aaa	624
Cys Lys Asn Ile Leu Ile Glu Lys Asp Lys Lys Cys Gly Thr Leu Lys	
195 200 205	
aca gat gtt tca gca gca cta gga agt ttt aaa aaa gaa aca tgt ctt	672
Thr Asp Val Ser Ala Ala Leu Gly Ser Phe Lys Lys Glu Thr Cys Leu	
210 215 220	
gaa tta ctc gaa caa tgc tat ttt tac att gga aat tgc gga gac gac	720
Glu Leu Leu Glu Gln Cys Tyr Phe Tyr Ile Gly Asn Cys Gly Asp Asp	
225 230 235 240	
gat ata att aaa tgt att gaa ttg gga gga aaa tgc caa gaa caa aat	768
Asp Ile Ile Lys Cys Ile Glu Leu Gly Gly Lys Cys Gln Glu Gln Asn	
245 250 255	
att gct tat atg cca cca gga ccc gat ttt gat cca act agg cca gag	816
Ile Ala Tyr Met Pro Pro Gly Pro Asp Phe Asp Pro Thr Arg Pro Glu	
260 265 270	
gct aca ata gca gag gat ata ggg ctg gaa gag ttt tat aag aag gta	864
Ala Thr Ile Ala Glu Asp Ile Gly Leu Glu Glu Phe Tyr Lys Lys Val	
275 280 285	
gag gag gat gga gtt ttt att gga aag aat cat cta aga gat gcg aca	912
Glu Glu Asp Gly Val Phe Ile Gly Lys Asn His Leu Arg Asp Ala Thr	
290 295 300	
gct ttg ttg gca ttg ttg atc caa gat tct agt ctt aaa aaa aaa gac	960
Ala Leu Leu Ala Leu Leu Ile Gln Asp Ser Ser Leu Lys Lys Lys Asp	
305 310 315 320	
gac aaa gag aaa tgc gaa gaa gcc ctt caa aaa agc tgc aaa aat cct	1008
Asp Lys Glu Lys Cys Glu Glu Ala Leu Gln Lys Ser Cys Lys Asn Pro	
325 330 335	
cat gaa cat gag gct tta gaa agt tta tgt aag aaa aat ggt tta agt	1056
His Glu His Glu Ala Leu Glu Ser Leu Cys Lys Lys Asn Gly Leu Ser	
340 345 350	
aat gat gga acg aaa aaa tgt gaa gaa ttg caa aat gat att aac aaa	1104
Asn Asp Gly Thr Lys Lys Cys Glu Glu Leu Gln Asn Asp Ile Asn Lys	
355 360 365	
act tgc aaa att ttc act tca aaa gtc act aat aat cgt ctt ttt gat	1152
Thr Cys Lys Ile Phe Thr Ser Lys Val Thr Asn Asn Arg Leu Phe Asp	
370 375 380	
cca aca aaa gga aat aat gaa att gtt gga tgg gaa ggg ttg cca aca	1200
Pro Thr Lys Gly Asn Asn Glu Ile Val Gly Trp Glu Gly Leu Pro Thr	
385 390 395 400	



ttt ctt agc aac gaa gat tgt gcg aaa ttg gag tcc tat tgt ttc tat	1248
Phe Leu Ser Asn Glu Asp Cys Ala Lys Leu Glu Ser Tyr Cys Phe Tyr	
405 410 415	
ttt gaa aaa aaa tgt cca gat gga gaa aat gca tgt aaa aat ata aga	1296
Phe Glu Lys Lys Cys Pro Asp Gly Glu Asn Ala Cys Lys Asn Ile Arg	
420 425 430	
gca aca tgt tac aaa aga gga ctt gat gca cgg gca aat aaa gtg ctg	1344
Ala Thr Cys Tyr Lys Arg Gly Leu Asp Ala Arg Ala Asn Lys Val Leu	
435 440 445	
caa gaa aat atg cga gga atg tta cat ggt tca aac aaa agc tgg ctt	1392
Gln Glu Asn Met Arg Gly Met Leu His Gly Ser Asn Lys Ser Trp Leu	
450 455 460	
gaa aag ttt caa caa gaa tta gta aaa gta tgt gag aaa ctg aaa aaa	1440
Glu Lys Phe Gln Gln Glu Leu Val Lys Val Cys Glu Lys Leu Lys Lys	
465 470 475 480	
gaa aac aaa gga agt ttc tca aac gat gaa tta ttt att ctg tgt gta	1488
Glu Asn Lys Gly Ser Phe Ser Asn Asp Glu Leu Phe Ile Leu Cys Val	
485 490 495	
cag cca gca aaa gca gcc cgg ttg ctt aca cat gat ctt cga atg aaa	1536
Gln Pro Ala Lys Ala Ala Arg Leu Leu Thr His Asp Leu Arg Met Lys	
500 505 510	
act atc ttt tta cga caa caa ctg gat caa aag cga gat ttc ccg aca	1584
Thr Ile Phe Leu Arg Gln Gln Leu Asp Gln Lys Arg Asp Phe Pro Thr	
515 520 525	
gat aaa aat tgc aag gaa ttg ggg aga aag tgc caa gat tta gga gag	1632
Asp Lys Asn Cys Lys Glu Leu Gly Arg Lys Cys Gln Asp Leu Gly Glu	
530 535 540	
gat tca aaa gaa att aca tgg cca tgt cat aca ctg gag cag caa tgc	1680
Asp Ser Lys Glu Ile Thr Trp Pro Cys His Thr Leu Glu Gln Gln Cys	
545 550 555 560	
aat cgc ttg ggg act aca gaa att tta aag cag gtt tta ttg gat gaa	1728
Asn Arg Leu Gly Thr Thr Glu Ile Leu Lys Gln Val Leu Leu Asp Glu	
565 570 575	
cac aaa gat act ttg aaa gac caa gaa agt tgt gta aaa tac cta aaa	1776
His Lys Asp Thr Leu Lys Asp Gln Glu Ser Cys Val Lys Tyr Leu Lys	
580 585 590	
gaa aag tgt aat aaa tgg tct aga aga gga gat gac cgt ttc tct ttt	1824
Glu Lys Cys Asn Lys Trp Ser Arg Arg Gly Asp Asp Arg Phe Ser Phe	
595 600 605	
gta tgt gtc ttc caa aac gct acg tgt gag ctg atg gta aaa gac gtg	1872
Val Cys Val Phe Gln Asn Ala Thr Cys Glu Leu Met Val Lys Asp Val	
610 615 620	
aaa gac agg tgt gaa gta ttc aaa aaa aat ata aaa gct tca tat att	1920
Lys Asp Arg Cys Glu Val Phe Lys Lys Asn Ile Lys Ala Ser Tyr Ile	
625 630 635 640	
att gaa ttt ctt gaa aat aat aca aat aaa ata aca aca ctg gaa aga	1968

Ile Glu Phe Leu Glu Asn Asn Thr Asn Lys Ile Thr Thr Leu Glu Arg	
645 650 655	
aat tgt ccc tct tgg cat acg tat tgc aat aga ttt tca cct aat tgt	2016
Asn Cys Pro Ser Trp His Thr Tyr Cys Asn Arg Phe Ser Pro Asn Cys	
660 665 670	
cca ggt ctt acg aaa gag aat agt tgt aca aaa atc aag aag cat cgt	2064
Pro Gly Leu Thr Lys Glu Asn Ser Cys Thr Lys Ile Lys Lys His Arg	
675 680 685	
gag ccg ttc tat aaa aga aag gcc ttg gaa gat gct ctc aaa gta gag	2112
Glu Pro Phe Tyr Lys Arg Lys Ala Leu Glu Asp Ala Leu Lys Val Glu	
690 695 700	
ctt caa gga aaa ttg act gat aaa tct aaa tgt gaa cct gca ttg aaa	2160
Leu Gln Gly Lys Leu Thr Asp Lys Ser Lys Cys Glu Pro Ala Leu Lys	
705 710 715 720	
aga tat tgt aca gta gcg gga aac gta aat aat gcg tca atc agt ggc	2208
Arg Tyr Cys Thr Val Ala Gly Asn Val Asn Asn Ala Ser Ile Ser Gly	
725 730 735	
tta tgc aaa gct aac acc aag gat aac tct gga aag agt gat gag gat	2256
Leu Cys Lys Ala Asn Thr Lys Asp Asn Ser Gly Lys Ser Asp Glu Asp	
740 745 750	
gct aga aag gaa ctc tgt gag aaa tta gtg aaa gaa gtg gaa gaa cag	2304
Ala Arg Lys Glu Leu Cys Glu Lys Leu Val Lys Glu Val Glu Glu Gln	
755 760 765	
tgc aaa gca tta cca aca gaa tta gga caa ccg gca gct gat cta aaa	2352
Cys Lys Ala Leu Pro Thr Glu Leu Gly Gln Pro Ala Ala Asp Leu Lys	
770 775 780	
aaa gat tat aag aca tat gag gaa ctt aag aaa cgt gca gag gaa gca	2400
Lys Asp Tyr Lys Thr Tyr Glu Glu Leu Lys Lys Arg Ala Glu Glu Ala	
785 790 795 800	
atg aac aag tcc agt ctt gtt ttg tca ctc att aag aaa aac gaa agt	2448
Met Asn Lys Ser Ser Leu Val Leu Ser Leu Ile Lys Lys Asn Glu Ser	
805 810 815	
aat gta tca aaa agt aat agc aaa aac aag gat aag aat gcc gtt tca	2496
Asn Val Ser Lys Ser Asn Ser Lys Asn Lys Asp Lys Asn Ala Val Ser	
820 825 830	
aac gga ctt caa gat acc aca aaa cat gtg aaa ata cta cgg agg gga	2544
Asn Gly Leu Gln Asp Thr Thr Lys His Val Lys Ile Leu Arg Arg Gly	
835 840 845	
gtt aag gat gta tcc gta aca gaa tta gaa gct aaa gca ttt gat ttg	2592
Val Lys Asp Val Ser Val Thr Glu Leu Glu Ala Lys Ala Phe Asp Leu	
850 855 860	
gca gca gaa gta ttt gga aga tat gta gat ttg aag gaa aga tgt aat	2640
Ala Ala Glu Val Phe Gly Arg Tyr Val Asp Leu Lys Glu Arg Cys Asn	
865 870 875 880	
aaa ttg gaa tca gat tgc aga att aag gag gat tgc aaa gac tta gaa	2688
Lys Leu Glu Ser Asp Cys Arg Ile Lys Glu Asp Cys Lys Asp Leu Glu	

885										890					895					
gaa gta tgc aaa aag att aat aag gct tgt cgc aat ctg aag cct ctg	2736																			
Glu Val Cys Lys Lys Ile Asn Lys Ala Cys Arg Asn Leu Lys Pro Leu																				
900 905 910																				
gag gtg aag ccg cac gaa aca gtg aca gaa agt aca acg aca act aca	2784																			
Glu Val Lys Pro His Glu Thr Val Thr Glu Ser Thr Thr Thr Thr																				
915 920 925																				
aca aca aca aca acc gtt gcc gat ccg aag gca acg gaa tgc aaa tcc	2832																			
Thr Thr Thr Thr Thr Val Ala Asp Pro Lys Ala Thr Glu Cys Lys Ser																				
930 935 940																				
tta cag aca aca gac aca tgg gtt aca cag aca tcg aca cac aca agc	2880																			
Leu Gln Thr Thr Asp Thr Trp Val Thr Gln Thr Ser Thr His Thr Ser																				
945 950 955 960																				
acg tct act atc aca tct acc atc aca tca aaa ata aca ttg aca tca	2928																			
Thr Ser Thr Ile Thr Ser Thr Ile Thr Ser Lys Ile Thr Leu Thr Ser																				
965 970 975																				
acg agg cga tgc aaa cca acc aag tgt acg aca gga gag gaa gat gat	2976																			
Thr Arg Arg Cys Lys Pro Thr Lys Cys Thr Thr Gly Glu Glu Asp Asp																				
980 985 990																				
gca gga gac gtg aaa ccg agt gag ggg ctg agg atg agt ggg tgg aat	3024																			
Ala Gly Asp Val Lys Pro Ser Glu Gly Leu Arg Met Ser Gly Trp Asn																				
995 1000 1005																				
gtg atg agg ggg gtg ata gta gca atg gtt att tcg ttc atg att tag	3072																			
Val Met Arg Gly Val Ile Val Ala Met Val Ile Ser Phe Met Ile																				
1010 1015 1020																				

&lt;210&gt; 14

&lt;211&gt; 1023

&lt;212&gt; PRT

<213> *Pneumocystis carinii* sp. f. *hominis*

&lt;400&gt; 14

Met	Ala	Arg	Ala	Val	Lys	Arg	Gln	Ala	Ala	Gly	Thr	Gln	Asn	Ser	Ile
1				5					10					15	

Asp	Glu	Glu	His	Val	Leu	Ala	Leu	Ile	Leu	Lys	Glu	Asp	Gly	Leu	Ser
			20					25					30		

Glu	Gln	Glu	Cys	Lys	Lys	Lys	Leu	Lys	Lys	Tyr	Cys	Gln	Glu	Leu	Thr
			35				40					45			

Glu	Ala	Lys	Leu	Asn	Ile	Glu	Gln	Val	His	Arg	Lys	Leu	Lys	Gly	Phe
	50					55					60				

Cys	Glu	Asp	Gly	Lys	Ala	Asp	Thr	Lys	Cys	Lys	Glu	Leu	Lys	Ala	Asn
65					70					75					80

Ile	Glu	Lys	Lys	Cys	Thr	Thr	Ile	Lys	Gly	Lys	Leu	Lys	Glu	Ala	Ile
				85					90					95	

Lys	Lys	Lys	Ile	Gln	Ile	Ile	Thr	Asp	Lys	Asp	Cys	Lys	Glu	Asn	Glu
			100					105					110		

Gln Gln Cys Leu Phe Leu Glu Gly Val Cys Ser Lys Glu Leu Lys Asp  
 115 120 125  
 Asp Cys Asn Thr Leu Arg Asn Lys Cys Tyr Gln Lys Lys Arg Asp Lys  
 130 135 140  
 Val Ala Glu Glu Val Leu Leu Arg Ala Leu Arg Ser Asp Leu Asn Gly  
 145 150 155 160  
 Ser Val Ile Cys Glu Lys Lys Leu Lys Glu Ile Cys Pro Val Met Gly  
 165 170 175  
 Arg Glu Ser Asp Glu Leu Thr Asn Leu Cys Leu Asn Gln Lys Glu Thr  
 180 185 190  
 Cys Lys Asn Ile Leu Ile Glu Lys Asp Lys Lys Cys Gly Thr Leu Lys  
 195 200 205  
 Thr Asp Val Ser Ala Ala Leu Gly Ser Phe Lys Lys Glu Thr Cys Leu  
 210 215 220  
 Glu Leu Leu Glu Gln Cys Tyr Phe Tyr Ile Gly Asn Cys Gly Asp Asp  
 225 230 235 240  
 Asp Ile Ile Lys Cys Ile Glu Leu Gly Gly Lys Cys Gln Glu Gln Asn  
 245 250 255  
 Ile Ala Tyr Met Pro Pro Gly Pro Asp Phe Asp Pro Thr Arg Pro Glu  
 260 265 270  
 Ala Thr Ile Ala Glu Asp Ile Gly Leu Glu Glu Phe Tyr Lys Lys Val  
 275 280 285  
 Glu Glu Asp Gly Val Phe Ile Gly Lys Asn His Leu Arg Asp Ala Thr  
 290 295 300  
 Ala Leu Leu Ala Leu Leu Ile Gln Asp Ser Ser Leu Lys Lys Lys Asp  
 305 310 315 320  
 Asp Lys Glu Lys Cys Glu Glu Ala Leu Gln Lys Ser Cys Lys Asn Pro  
 325 330 335  
 His Glu His Glu Ala Leu Glu Ser Leu Cys Lys Lys Asn Gly Leu Ser  
 340 345 350  
 Asn Asp Gly Thr Lys Lys Cys Glu Glu Leu Gln Asn Asp Ile Asn Lys  
 355 360 365  
 Thr Cys Lys Ile Phe Thr Ser Lys Val Thr Asn Asn Arg Leu Phe Asp  
 370 375 380  
 Pro Thr Lys Gly Asn Asn Glu Ile Val Gly Trp Glu Gly Leu Pro Thr  
 385 390 395 400  
 Phe Leu Ser Asn Glu Asp Cys Ala Lys Leu Glu Ser Tyr Cys Phe Tyr  
 405 410 415  
 Phe Glu Lys Lys Cys Pro Asp Gly Glu Asn Ala Cys Lys Asn Ile Arg  
 420 425 430

Ala Thr Cys Tyr Lys Arg Gly Leu Asp Ala Arg Ala Asn Lys Val Leu  
 435 440 445  
 Gln Glu Asn Met Arg Gly Met Leu His Gly Ser Asn Lys Ser Trp Leu  
 450 455 460  
 Glu Lys Phe Gln Gln Glu Leu Val Lys Val Cys Glu Lys Leu Lys Lys  
 465 470 475 480  
 Glu Asn Lys Gly Ser Phe Ser Asn Asp Glu Leu Phe Ile Leu Cys Val  
 485 490 495  
 Gln Pro Ala Lys Ala Ala Arg Leu Leu Thr His Asp Leu Arg Met Lys  
 500 505 510  
 Thr Ile Phe Leu Arg Gln Gln Leu Asp Gln Lys Arg Asp Phe Pro Thr  
 515 520 525  
 Asp Lys Asn Cys Lys Glu Leu Gly Arg Lys Cys Gln Asp Leu Gly Glu  
 530 535 540  
 Asp Ser Lys Glu Ile Thr Trp Pro Cys His Thr Leu Glu Gln Gln Cys  
 545 550 555 560  
 Asn Arg Leu Gly Thr Thr Glu Ile Leu Lys Gln Val Leu Leu Asp Glu  
 565 570 575  
 His Lys Asp Thr Leu Lys Asp Gln Glu Ser Cys Val Lys Tyr Leu Lys  
 580 585 590  
 Glu Lys Cys Asn Lys Trp Ser Arg Arg Gly Asp Asp Arg Phe Ser Phe  
 595 600 605  
 Val Cys Val Phe Gln Asn Ala Thr Cys Glu Leu Met Val Lys Asp Val  
 610 615 620  
 Lys Asp Arg Cys Glu Val Phe Lys Lys Asn Ile Lys Ala Ser Tyr Ile  
 625 630 635 640  
 Ile Glu Phe Leu Glu Asn Asn Thr Asn Lys Ile Thr Thr Leu Glu Arg  
 645 650 655  
 Asn Cys Pro Ser Trp His Thr Tyr Cys Asn Arg Phe Ser Pro Asn Cys  
 660 665 670  
 Pro Gly Leu Thr Lys Glu Asn Ser Cys Thr Lys Ile Lys Lys His Arg  
 675 680 685  
 Glu Pro Phe Tyr Lys Arg Lys Ala Leu Glu Asp Ala Leu Lys Val Glu  
 690 695 700  
 Leu Gln Gly Lys Leu Thr Asp Lys Ser Lys Cys Glu Pro Ala Leu Lys  
 705 710 715 720  
 Arg Tyr Cys Thr Val Ala Gly Asn Val Asn Asn Ala Ser Ile Ser Gly  
 725 730 735  
 Leu Cys Lys Ala Asn Thr Lys Asp Asn Ser Gly Lys Ser Asp Glu Asp  
 740 745 750  
 Ala Arg Lys Glu Leu Cys Glu Lys Leu Val Lys Glu Val Glu Glu Gln

755

760

765

Cys Lys Ala Leu Pro Thr Glu Leu Gly Gln Pro Ala Ala Asp Leu Lys  
 770 775 780  
 Lys Asp Tyr Lys Thr Tyr Glu Glu Leu Lys Lys Arg Ala Glu Glu Ala  
 785 790 795 800  
 Met Asn Lys Ser Ser Leu Val Leu Ser Leu Ile Lys Lys Asn Glu Ser  
 805 810 815  
 Asn Val Ser Lys Ser Asn Ser Lys Asn Lys Asp Lys Asn Ala Val Ser  
 820 825 830  
 Asn Gly Leu Gln Asp Thr Thr Lys His Val Lys Ile Leu Arg Arg Gly  
 835 840 845  
 Val Lys Asp Val Ser Val Thr Glu Leu Glu Ala Lys Ala Phe Asp Leu  
 850 855 860  
 Ala Ala Glu Val Phe Gly Arg Tyr Val Asp Leu Lys Glu Arg Cys Asn  
 865 870 875 880  
 Lys Leu Glu Ser Asp Cys Arg Ile Lys Glu Asp Cys Lys Asp Leu Glu  
 885 890 895  
 Glu Val Cys Lys Lys Ile Asn Lys Ala Cys Arg Asn Leu Lys Pro Leu  
 900 905 910  
 Glu Val Lys Pro His Glu Thr Val Thr Glu Ser Thr Thr Thr Thr Thr  
 915 920 925  
 Thr Thr Thr Thr Thr Val Ala Asp Pro Lys Ala Thr Glu Cys Lys Ser  
 930 935 940  
 Leu Gln Thr Thr Asp Thr Trp Val Thr Gln Thr Ser Thr His Thr Ser  
 945 950 955 960  
 Thr Ser Thr Ile Thr Ser Thr Ile Thr Ser Lys Ile Thr Leu Thr Ser  
 965 970 975  
 Thr Arg Arg Cys Lys Pro Thr Lys Cys Thr Thr Gly Glu Glu Asp Asp  
 980 985 990  
 Ala Gly Asp Val Lys Pro Ser Glu Gly Leu Arg Met Ser Gly Trp Asn  
 995 1000 1005  
 Val Met Arg Gly Val Ile Val Ala Met Val Ile Ser Phe Met Ile  
 1010 1015 1020

&lt;210&gt; 15

&lt;211&gt; 249

&lt;212&gt; DNA

<213> *Pneumocystis carinii* sp. f. *hominis*

&lt;220&gt;

&lt;221&gt; CDS

&lt;222&gt; (1)..(249)

&lt;400&gt; 15

gag tgc caa tct ctg cag acg aca gac acg tgg gtc aca aag acg tcg 48  
 Glu Cys Gln Ser Leu Gln Thr Thr Asp Thr Trp Val Thr Lys Thr Ser  
 1 5 10 15  
 acc cat act agc act tct acg act acg tcc aca gtc aca tcg aga ata 96  
 Thr His Thr Ser Thr Ser Thr Thr Thr Ser Thr Val Thr Ser Arg Ile  
 20 25 30  
 aca ctc acc tca acg agg cgg tgt aag cct acg aag tgt acg aca gga 144  
 Thr Leu Thr Ser Thr Arg Arg Cys Lys Pro Thr Lys Cys Thr Thr Gly  
 35 40 45  
 gag gaa gat gat gca gga gag gtg aag ccg agt gaa ggg ctg agg atg 192  
 Glu Glu Asp Asp Ala Gly Glu Val Lys Pro Ser Glu Gly Leu Arg Met  
 50 55 60  
 agt ggg tgg agt gtg atg agg ggg gtg tta tta gca atg atg att tca 240  
 Ser Gly Trp Ser Val Met Arg Gly Val Leu Leu Ala Met Met Ile Ser  
 65 70 75 80  
 ttc atg att 249  
 Phe Met Ile

<210> 16  
 <211> 83  
 <212> PRT  
 <213> *Pneumocystis carinii* sp. f. *hominis*

<400> 16  
 Glu Cys Gln Ser Leu Gln Thr Thr Asp Thr Trp Val Thr Lys Thr Ser  
 1 5 10 15  
 Thr His Thr Ser Thr Ser Thr Thr Thr Ser Thr Val Thr Ser Arg Ile  
 20 25 30  
 Thr Leu Thr Ser Thr Arg Arg Cys Lys Pro Thr Lys Cys Thr Thr Gly  
 35 40 45  
 Glu Glu Asp Asp Ala Gly Glu Val Lys Pro Ser Glu Gly Leu Arg Met  
 50 55 60  
 Ser Gly Trp Ser Val Met Arg Gly Val Leu Leu Ala Met Met Ile Ser  
 65 70 75 80  
 Phe Met Ile

<210> 17  
 <211> 25  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: synthetic  
 oligonucleotide

<400> 17  
 gaatgcaaat ccttacagac aacag 25

<210> 18  
<211> 25  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: synthetic  
oligonucleotide

<400> 18  
gaatgcaaat ctttacagac aacag

25

<210> 19  
<211> 26  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: synthetic  
oligonucleotide

<400> 19  
tgcaaacc aa ccaagtgtac gacagg

26

<210> 20  
<211> 25  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: synthetic  
oligonucleotide

<400> 20  
aaatcatgaa cgaaataacc attgc

25

<210> 21  
<211> 30  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: synthetic  
oligonucleotide

<400> 21  
tttcatatgg cgcgggcggt caagcggcag

30

<210> 22  
<211> 30  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: synthetic  
oligonucleotide



<400> 22  
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<210> 23  
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<220>  
<223> Description of Artificial Sequence: synthetic  
oligonucleotide

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oligonucleotide

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<220>  
<223> Description of Artificial Sequence: synthetic  
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1 5 10 15

Leu Leu Glu Lys Ile Met  
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<220>  
<223> Description of Artificial Sequence: synthetic  
peptide

<400> 26  
Thr Ile Thr Ser Thr Ile Thr Ser Lys Ile Thr Leu Thr Ser Thr  
1 5 10 15